CERTIFIED INVESTMENT AND FINANCIAL ANALYSTS (CIFA)

ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 2 December 2025. Morning Paper. **Time Allowed: 3 hours.**

This paper consists of five (5) questions. Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Discuss **FOUR** ways in which private equity firms align their interests with those of the managers of portfolio companies. (8 marks)

(b) Rockbridge Capital PLC, an investment firm with an excess of Sh.2 billion assets under management (AUM) has been considering diversifying their portfolio through investment in a shopping mall real estate investment trust (REIT).

The table below shows the information relating to the REIT:

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	Sh."million"
Estimated 12 months cash net operating income (NOI)	320
Actual funds from operation (FFO) for financial year 2024	210
Cash and cash equivalents	195
Accounts receivable	105
Debt and other liabilities	1,200
Non-cash rents	15
Recurring maintenance cost (capital expenditure)	45
Expected annual dividends to be paid in 2025	15

Additional information:

1. The shares outstanding amounted to 30 million.
2. The dividend growth rate in the year 2026 and 2027 is expected to be 2% per annum and from 2028 into perpetuity to be 1% per annum.
3. The assumed cap rate is 10%.
4. The shopping mall subsector average price-to funds from operations (P/FFO) ratio is 10 times while that of price-to-average funds from operation (P/AFFO) is 14 times.
5. Rockbridge's applicable cost of equity capital is 10% while the risk-free rate is 3%.

Required:

Calculate the value per share of the REIT using:

(i) Net asset value (NAV) approach. (3 marks)

(ii) Price-to-funds from operation (P/FFO) ratio approach. (3 marks)

(iii) Price-to-average funds from operations (P/AFFO) ratio approach. (3 marks)

(iv) Discounted cash flow (DCF) approach. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) Highlight **FOUR** ways in which alternative investments complement traditional investments. (4 marks)

(b) Explain **THREE** roles of outside service providers in the alternative investing environment. (6 marks)

(c) Consider a Monte Carlo Simulation analysis of a collateralised mortgage obligation (CMO) tranche with 6 representative paths. The market value of the tranche is Sh.95.63 million.

Representative path	Path weight (%)	If spread = 60bps	If spread = 65bps	If spread = 70 bps
1	20	98	96	94
2	18	96	94	92
3	15	93	91	89
4	12	95	93	91
5	20	102	100	98
6	15	100	98	96

Required:

(i) The theoretical tranche values for each of the three spreads. (4 marks)

(ii) The option-adjusted spread (OAS) of the tranche. (2 marks)

(iii) Describe TWO assumptions of Monte Carlo Simulation used when calculating option adjusted spread (OAS). (4 marks)

(Total: 20 marks)

QUESTION THREE

(a) Assess **THREE** investor-related motivations that drive investors to include structured products in their portfolios. (6 marks)

(b) The following market data for a commodity was reported:

1. The spot price (S_o) is Sh.70
2. The 9-month forward price is Sh.72.
3. The continuously compounded risk-free rate is 4% per annum.
4. The continuous storage cost 1% per annum.

Required:

The implied convenience yield for the 9-moth horizon. (6 marks)

(c) A mortgage pass-through security is backed by a pool with an outstanding principal balance of Sh.100,000,000, a coupon rate of 8% per annum and a remaining term of 20 years.

Assume the conditional prepayment rate (CPR) is 6% for the first 12 months and then increases to 12% from month 13 onwards.

Required:

(i) The single monthly mortality (SMM) for each of the two CPR levels. (3 marks)

(ii) The prepayment amount for month 13 given that the outstanding principal balance at the beginning of month 13 is Sh.95 million and scheduled principal repayment for the month is Sh.180,000. (3 marks)

(iii) The total principal repayment for month 13. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Distinguish between the terms “contango” and” backwardation” as applied in commodities markets. (4 marks)

(b) Examine **THREE** factors that one would consider in determining the appropriate crowdfunding platform to use. (6 marks)

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(c) A 20-year-old industrial property is being valued using the cost approach. The appraiser feels that it has an effective age of 25 years based on its current condition. The appraiser believes that it has 50 years remaining economic life (75 years total economic life).

The building was constructed using a greater ceiling height than users require in the current market. It would cost Sh.54 million to reproduce a building with the same ceiling height but Sh.50 million to construct a replacement property with the same utility but a normal ceiling height.

The higher would result in increased air conditioning costs of Sh.100,000 per year. A cap rate that would be used to value the property would be 10%.

The building was designed to include a theatre stage that is no longer functional. This area can be converted to useable space at a conversion cost of Sh.50,000 and it is believed that the value of the property would increase by at least this amount.

The roof needs to be replaced at a cost of Sh.500,000 and other necessary repairs would amount to Sh.100,000. The cost of these repairs will increase the value of the building by at least Sh.600,000 costs.

The road providing access to the property is in despaired state and has a negative impact on rents which are estimated to reduce net operating income by Sh.200,000 per year.

Based on comparable sale of vacant land, the land is estimated to be worth Sh.10 million.

Required:
Determine the value of the building using the cost approach. (10 marks)
(Total: 20 marks)

QUESTION FIVE

(a) A hedge fund charges a 2% management fee and a 20% incentive fees (performance fee) on annual profits. An investor commits Sh.50 million at the start of the year. At the end of the year, the portfolio value is Sh.58 million.

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Required:
(i) The total annual hedge fund fees. (2 marks)

(ii) The net return to the investor in percentage. (2 marks)

(b) A collateralised debt obligation (CDO) manager set up a cash funded CDO with a collateral pool of Sh.800 million in a corporate bonds generating an average coupon of 9% per annum.

The CDO issues three tranches as follows:

Tranche	Principal (Sh. million)	Coupon rate	Subordination level
Senior	480	6%	40%
Mezzanine	240	10%	10%
Equity	80	Residual	-

Annual management fees = 1% of total collateral
Expected annual credit losses on the collateral = 3% of collateral value.

Required:
(i) The total annual interest income generated by the collateral. (2 marks)

(ii) The annual payment to each tranche before losses and fees. (2 marks)

(iii) The amount of loss absorbed by each tranche, assuming losses are applied from the equity tranche upwards. (2 marks)

(c) A company's founders believe that their company can be sold for Sh.60 million in four years. The company needs Sh.6 million in capital now and Sh.3 million in three years. The founders want to hold 1 million shares. The venture capital firm uses a discount rate of 50% over all four years.

Required:
Calculate the following:

(i) Post-money valuation at the time of second-round financing. (1 mark)

(ii) Post-money valuation at the time of first round financing. (1 mark)

(iii) The required fractional ownership for the second-round investors. (2 marks)

(iv) Fractional ownership for the first-round investors after dilution by the second-round investors. (2 marks)

(v) Share price after the first round of financing. (2 marks)

(vi) Share price after the second round of financing. (2 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 19 August 2025. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Describe **FOUR** types of capital markets in alternative investments. (4 marks)

(b) A real estate investment fund has an initial drawdown of Sh.150 million in its first year, fully drawn to acquire a commercial property. The fund offers a preferred return (soft hurdle rate) of 10% per annum to Limited Partners (LPs) and features a 70/30 carried interest structure (no catch-up) between LPs and the General Partner (GP) after the hurdle is met. At the end of year three, the property is sold for Sh.240 million.

Required:
Determine the total payout to:

(i) The Limited Partner (LP). (5 marks)

(ii) The General Partner (GP). (1 mark)

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(c) Ali Ltd. is a property developer that specialises in turning under-utilised land into residential properties. The company has come across a plot of land that it is interested in and would like to estimate the value of the option to develop the land using a single-period binomial option pricing model. The risk free rate of return is 0%.

The company forecasts the following:

1. If the economy weakens, the construction cost will be Sh.1,800,000 and the value of the completed project will be Sh.1,500,000.
2. If the economy strengthens, the construction cost will rise to Sh.2,600,000 and the value of the completed project will be Sh.3,600,000.
3. Comparable finished properties in the area are currently valued at Sh.2,200,000.

Required:

(i) Calculate the value of the call option to develop the land. (4 marks)

(ii) Determine the value of the call option assuming the construction cost is fixed at Sh.2,200,000 regardless of economic outcome. (3 marks)

(iii) Calculate the value of the call option assuming the property value in a strong economy increases to Sh.4,200,000 keeping the original construction costs. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) Assess **THREE** strategies used to mitigate adverse selection in alternative investments. (6 marks)

(b) The collateral pool of a collateralised debt obligation (CDO) has Sh.50 million in high yield bonds with an average credit rating of BB and an average yield of 8%. The CDO has issued the following securities:

- **Senior tranche:** Sh.30 million, AA rated and 4% yield.
- **Mezzanine tranche:** Sh.15 million, B rated and 9% yield.
- **Equity tranche:** Sh.5 million, unrated.

Required:

(i) Ignoring fees and expenses and assuming no defaults, calculate the annual payment to the equity tranche. (2 marks)

(ii) Determine the lower attachment point on the mezzanine tranche. (2 marks)

(c) Lawi Simon is evaluating collateralised mortgage obligation (CMO) structures for a new mortgage backed security issuance as shown below:

Structure I:

Tranche	Par amount (Sh. million)	Coupon rate (%)
A	100	6.25
B	120	6.75
C	180	7.25
D	150	7.75
E	150	8.00
F	500	8.50

- Tranches A – E are Planned Amortisation Class (PAC) interest only tranches.
- Tranche F is a support (companion) tranche.

Structure II:

Tranche	Par amount (Sh. million)	Coupon rate (%)
A	100	6.25
B	120	6.75
C	180	7.25
D	150	7.75
E	150	8.00
F	250	8.25
G	250	??

- Tranche A – E remain PAC interest only (IO) tranches.
- Tranche F is now a PAC II.
- Tranche G is the support tranche with no set amortisation schedule.
- Structure II is derived by splitting the original support tranche F (Sh.500 million in Structure I) into two tranches: PAC II(F: Sh.250 million) and support (G: Sh.250 million).

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Required:

(i) Calculate the coupon rate for tranche G in Structure II assuming that the combined weighted average coupon for tranches F and G remains 8.50%. (4 marks)

(ii) Explain the effect on value and average life of tranches A to E by including a PAC tranche in Structure II. (3 marks)

(iii) Explain the difference in average life variability between tranche G in Structure II and tranche F in Structure I. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Distinguish between "alternative investments" and "traditional investments" based on the following areas:

(i) Information asymmetries. (2 marks)

(ii) Incomplete markets. (2 marks)

(iii) Innovation. (2 marks)

(b) The spot price of gold is Sh.410,800 per ounce and the three month forward contract price is Sh.406,900. An investor can borrow or lend cash at 5% and the lease rate for gold is 6%. These are continuously compounded interest rates.

Required:

(i) Describe how an investor can earn a profit from the difference between the spot and forward price. (3 marks)

(ii) Calculate the arbitrage profit. (3 marks)

(c) The net operating income (NOI) for a small income property is expected to be Sh.1.5 million for the first year. Financing will be based on a 1.2 debt coverage ratio (DCR) applied to the first year NOI, will have a 10% interest rate and will be amortised over 20 years with monthly payments. The NOI will increase by 3% per year after the first year. The investor expects to hold the property for five years. The resale price is estimated by applying a 9% terminal capitalisation rate for the sixth year NOI. Investors require a 12% rate of return on equity (equity yield rate) for this type of property.

Required:

(i) Calculate the present value of the equity interest in the property. (4 marks)

(ii) Determine the total present value of the property (mortgage and equity interests). (3 marks)

(iii) Based on your results in (c) (ii) above, determine the implied overall capitalisation rate. (1 mark)

(Total: 20 marks)

QUESTION FOUR

(a) Explain **TWO** categories of protective covenants in venture capital limited partnerships. (4 marks)

(b) John Njue is buying a house. He will borrow Sh.25 million and choose either a 30-year, fixed rate mortgage or a 10/20 interest only loan. The annual interest rate is 5% for either loan.

Required:

Determine by how much the loan payment will increase during the principal paying years assuming John Njue chooses the 10/20 interest only loan instead of a 30-year fixed rate loan. (6 marks)

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(c) Damaris Lokere, a portfolio manager for a commodity-focused hedge fund has observed supply shocks in the copper market due to geopolitical tensions. Copper is widely used in electronics and infrastructure. The spot price of copper is Sh.245,000 per tonne while the three month forward contract is priced at Sh.242,300 per tonne.

Damaris Lokere decides to implement a reverse cash and carry arbitrage to profit from the difference between spot and forward markets. The continuously compounded interest rate for borrowing or lending is 4.5% per annum and the lease rate for copper is 3.2% per annum. She anticipates a spike in infrastructure projects which could increase the convenience yield for copper in the near future.

Required:

(i) Describe **TWO** components of the synthetic commodity position in this arbitrage. (4 marks)

(ii) Calculate Damaris Lokere's profit on a reverse cash and carry arbitrage in the copper market. (4 marks)

(iii) Explain how a higher convenience yield would affect the no-arbitrage forward price range. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) In relation to crowd funding, analyse **THREE** types of prediction markets. (6 marks)

(b) You are given the following results from a Monte Carlo simulation of an Agency collateralised mortgage obligation (CMO) structure under 10% interest rate volatility:

Tranche	Option Adjusted Spread (OAS) basis points	Z-spread basis points	Effective duration
Collateral	85	125	7.5
PAC A1	40	55	1.8
PAC A2	65	80	3.4
PAC A3	35	100	6.2
Support B1	30	155	10.5
Support B2	45	175	13.0
PAC B1	75	135	3.8
PAC B2	20	270	6.5

Required:

(i) Calculate the option cost (in basis points) for Planned Amortisation Class (PAC) A1, PAC B1 and Support B1. (3 marks)

(ii) Identify which planned amortisation class (PAC) tranche is expensive on a relative value basis. (1 mark)

(iii) Identify which support tranche is expensive on a relative value basis.

(**Hint:** Support tranches include PAC B2, Support B1 and Support B2). (2 marks)

(c) Zeus Ltd. is a hedge fund with Sh.100 million in Kenya and charges a 20% incentive fee on gains above the high water mark (HWM). The fund returns 15% in year 1, –10% in year 2 and 20% in year 3. The fund charges no management fee.

Required:

(i) Compute the incentive fees for each year. (6 marks)

(ii) Comment on the cumulative effect of the high water mark (HWM). (2 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

WEDNESDAY: 23 April 2025. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Describe **FOUR** challenges experienced during the historical evolution of alternative investments. (8 marks)

(b) KN Capital (KNC) is considering a leveraged buyout (LBO) of Optimax Capital which has been experiencing poor operating results over the last few years. The revenue and earnings before interest tax depreciation and amortisation (EBITDA) for Optimax Capital have been declining rapidly but KNC believes that it has found a new management team that will stabilise Optimax Capital. Optimax Capital currently has EBITDA of Sh.250 million and KNC believes that the new management team could keep EBITDA constant for the next five years.

KNC has obtained debt financing of Sh.750 million at an interest rate of 10% and Optimax Capital expects working capital to be a source of funds at a cost of Sh.6 million per year. It also requires capital expenditure of Sh.35 million per year. KNC plans to sell Optimax Capital after five years at an enterprise value to EBITDA multiple of 6.0X.

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Additional information:

1. Assume that excess cash is not used to repay debt and instead accumulates on the statement of financial position.
2. There are no transaction fees, zero minimum cash required and the property, plant and equipment on the statement of financial position remains constant for the next five years.
3. The corporation tax rate is 30%.

Required:

Calculate:

(i) Net income for the five years. (4 marks)

(ii) Cash generated assuming no debt repayment. (4 marks)

(iii) The purchase price required for KNC to obtain a 3.0X multiple of invested capital (MOIC). (4 marks)

(Total: 20 marks)

QUESTION TWO

(a) Assess **THREE** roles of sell-side participants as used in alternative investments environment. (6 marks)

(b) A tranche of a mortgaged backed security has been split to create a floater with a principal of Sh.71,428,571 and an inverse floater of Sh.28,571,429. The tranche has a coupon of 7.5% per annum.

Required:

(i) The cap rate for the inverse floater when the coupon rate for the floater is LIBOR plus 150 basis points. (4 marks)

(ii) The cap rate for the floater when the coupon rate for the floater is LIBOR plus 150 basis points and a floor is imposed on the inverse floater of zero. (2 marks)

(c) A trustee of Gamma Trust is considering a collateralised debt obligation (CDO) that has a Sh.500 million structure. The collateral is expected to have an initial value of Sh.500 million which consists entirely of bonds with 15 years to maturity and a coupon rate equal to 15 year treasury bond rate plus 450 basis points. The senior tranche represents 70% of the structure and carries a floating coupon rate of equal to LIBOR plus 250 basis points. There is only one Sh.50 million mezzanine tranche which carries a fixed coupon equal to the treasury rate at origination plus 195 basis points. The trustee has entered into an interest rate swap under which the Trust will pay an annual fixed rate equal to treasury rate plus 145 basis points and receive LIBOR. The notional amount for this swap is Sh.350 million. The 15 year treasury rate is 8% at the time of origination of this CDO.

Required:
Calculate the cashflow available to pay the tranche. (8 marks)

(Total: 20 marks)

QUESTION THREE

(a) In the context of commodities market, explain the following theories:

(i) Theory of storage. (2 marks)

(ii) Hotelling's theory. (2 marks)

(iii) Julian Simon's theory. (2 marks)

(b) A stock index has a spot price of Sh.2,500. The risk-free rate is 3% per annum and the index provides a continuous dividend yield of 1.5% per annum.

Required:

(i) Compute the fair price of a 9-month forward contract. (3 marks)

(ii) If the actual forward price in the market is Sh.2,510, advise an investor on an appropriate strategy to take. (1 mark)

(c) Tabby investments Ltd. is considering equity investments in real estate. The two options under consideration are illustrated below:

Option A
Investment in a public real estate investment trust (REIT)

Recent net operating income (NOI)	Sh.140 million
Non-cash rents	Sh.5 million
Fully year adjustment for acquisition	Sh.5 million
Other assets	Sh.50 million
Total liabilities	Sh.300 million
Current market price per share	Sh.125
Shares outstanding	15 million
Going in capitalisation	7%
Net operating income growth rate	2.5%

Option B
Equity investment in a public real estate operating company (REOC)

Present value of all dividends for 7 years	Sh.39.7 million
Shares outstanding	1 million
Capitalisation rate	7%
Growth rate from year 8	2.5%
Expected adjusted funds from operations (AFFO) in year 8	Sh.13.5 million
Holding period	7 years

Additional information:
1. The REOC terminal value at the end of seven years is to be based on a price to AFFO multiple of 12 times.
2. The real estate market expectations are that mortgage rates are likely to remain low for at least seven more years and the economy is expected to enjoy above average growth rate.

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Required:

(i) Using the net asset value approach, determine whether the REIT identified in Option A is fairly priced. (5 marks)

(ii) Using the discounted cash flow approach, calculate the estimated value per share of Option B. (3 marks)

(iii) Provide **ONE** reason why Option B would be preferred over Option A. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Outline **FOUR** features of peer-to-peer lending. (4 marks)

(b) A real estate property cost Sh.200 million. The property will be sold at the end of three years for Sh.146 million. The property is worth Sh.200 million and will decline in value by 10% per year due to wear and tear. The property will generate cash flows equal to 20% of the value of the property in the current year. The tax rate is 30%.

Required:

Calculate the internal rate of return of the property assuming all cashflows occur at year end. (6 marks)

(c) Apolo Ltd., a hedge fund whose value is Sh.400 million, has a 20% incentive fees. In addition, there is no hurdle rate of high water mark thus at the beginning of the year, the incentive fee option is reset at the money.

Required:

(i) Calculate incentive fee on a call option assuming annual volatility of net asset value (NAV) is 10%. (3 marks)

(ii) Calculate incentive fee on a call option assuming annual volatility of net asset value (NAV) is 20%. (3 marks)

(iii) Explain **TWO** difficulties in applying traditional portfolio analysis to hedge funds. (4 marks)

(Total: 20 marks)

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QUESTION FIVE

(a) Describe **THREE** types of structured investment products in the structured products market. (6 marks)

(b) The following information relates to the coupon curve of prices for a pass through security for some months:

Coupon rate (%)	7	8	9	10	11	12
Price (Sh.)	93.06	96.07	99.55	103.25	105.90	110.35

Required:

(i) Compute the coupon curve duration for the 10% coupon pass through security. (3 marks)

(ii) Enumerate **TWO** advantages of the coupon curve duration. (2 marks)

(c) Canaan Investment Fund is a private equity fund that is six years old. The fund is ongoing. Investors invested Sh.100 million at fund inception and received a distribution of funds of Sh.75 million at the end of year 5 and Sh.50 million distribution at the end of year 6. The net asset value of the firm at the end of year 6 is estimated to be Sh.250 million. The investors required rate of return is 22% and the cost of capital is 20%.

Required:

Calculate the following:

(i) Interim internal rate of return (IIRR). (3 marks)

(ii) Modified internal rate of return (MIRR). (3 marks)

(iii) Total value to paid in ratio (TVPI). (1 mark)

(iv) Distribution to paid-in-ratio (DPI). (1 mark)

(v) Residual value to paid-in-ratio (RVPI). (1 mark)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 3 December 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) (i) Outline **THREE** differences between "traditional investments" and "alternative investments" based on return characteristics. (3 marks)

(ii) Advise a client on **THREE** benefits of introducing alternative investment in a portfolio. (3 marks)

(b) An appraiser has been asked to estimate the value of a warehouse and has collected the following information:

Unit of comparison	**Subject Property**	**Comparable transaction** 1	2	3
Size in square meters	3,000	4,000	2,000	3,500
Age in years	5	9	4	5
Physical condition	Average	Good	Average	Poor
Location	Prime	Prime	Secondary	Prime
Sale date, months ago		6	18	12
Sale price (Sh.)		90 million	45 million	80 million

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Additional information:

1. Each adjustment is based on unadjusted sales price of the comparable.
2. Properties depreciate at the rate of 3% per annum.
3. Conditional adjustment:
   - Good: +5%
   - Average: none
   - Poor: -5%
4. Locational adjustment:
   - Prime: none
   - Secondary: -10%
5. Over the past 24 months, sales price have been appreciating at the rate of 0.5% per month.

Required:

Calculate the value of the subject property using the sales comparison approach. (8 marks)

(c) A tranche M with a par amount of Sh.100,000,000 and a coupon rate of 9% has been split to create a floater with a principal of Sh.83 million and an inverse floater with a principal of Sh.17 million.

Required:

(i) Determine the cap rate for the inverse floater if the coupon rate for the floater is 1 month secured overnight financing rate (SOFR) plus 2%. (4 marks)

(ii) Determine the cap rate on the floater if the coupon formula for the floater is 1 month SOFR plus 2% and a floor is imposed on the inverse floater of zero. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Assess **THREE** motivations for using hedge fund replication strategies. (6 marks)

(b) A single tenant apartment was leased 8 years ago at Sh.960,000 per year. The next rent review occurs in two years. The estimated rental value in two years based on the current market condition is Sh.1,200,000 per year. The all risk yield (cap rate) for comparable fully let properties is 9%. Since the risk is lower, the appropriate rate to discount the term rent is 8%.

Required:

Calculate the value of the apartment using term reversion method. (6 marks)

(c) Tamu Ltd. is a hedge fund with a value of Sh.200 million at the beginning of the year. It charges a 2% management fees based on assets under management at the beginning of the year and a 20% incentive fee with a 5% hard hardle rate. It also uses a high watermark (HWM) provision. Incentive fees are calculated on gains net of management fees. The ending values before management fees are as follows:
Year 1: Sh.230 million
Year 2: Sh.235 million
Year 3: Sh.238 million

Required:

(i) The total fees for year 1. (2 marks)

(ii) The total fees for year 2. (2 marks)

(iii) The total fees for year 3. (2 marks)

(iv) The net return for an investor at the end of year 3. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Enumerate **FOUR** shortcomings of using special purpose acquisition company (SPAC) in private equity exit strategies. (4 marks)

(b) A leveraged buyout transaction (LBO) is valued at Sh.500 million. The transaction is financed with 50% debt and 50% equity. The Sh.250 million equity investment is further broken into Sh.240 million of preference shares owned by the private equity fund, Sh.9.5 million of equity owned by the private fund and Sh.0.5 million of management equity. The preference shares are promised a 12% annual return and paid on exit. The private firm equity is promised 95% of the residual value of the firm after creditors and preference shares are paid and management equity holders are promised the remaining 5%.
Senior debt holders have been partially paid with operational cash flows thereby reducing debt from Sh.250 million to Sh.160 million.
The exit value five years after investment is 1.6 times the original cost.

Required:

(i) Calculate the payoff for the company's claimant. (3 marks)

(ii) Calculate the payoff multiple and the internal rate of return (IRR) for the equity claimants. (5 marks)

(c) Paul Mwaruma believes that he has identified an arbitrage opportunity for a commodity as indicated by the commodity price and interest rate information below:

Spot price for commodity	Sh.180
Futures price for commodity expiring in one year	Sh.200
Interest rate for one year	12%

Required:

(i) Describe the transactions necessary to take advantage of this specific arbitrage opportunity. (2 marks)

(ii) Compute the arbitrage profit. (3 marks)

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(iii) Describe **THREE** market imperfections that could limit Paul Mwaruma's ability to implement this arbitrage strategy. (3 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Evaluate **THREE** functions of financial markets in alternative investments. (6 marks)

(b) Bob Mwakirunge has invested in a mortgage pool with a Sh.1,000,000 principal balance outstanding. The scheduled monthly principal payment is Sh.286.10.
The mortgage pool has a conditional prepayment rate (CPR) of 6% and the pool is seasoned. (The pool is older than 30 months).

Required:

(i) The single monthly mortality (SMM) rate. (2 marks)

(ii) The prepayment for the month. (2 marks)

(iii) Single monthly mortality (SMM) rate in month 10, assuming 175% Public Security Association (PSA). (2 marks)

(c) Suppose a fund has a committed capital of Sh.100 million and carried interest of 20%. An investment of Sh.40 million is made. Later in the year, the fund exits the investment and earns a profit of Sh.22 million.

Required:
Determine whether the general partner (GP) receives any carried interest under the following distribution waterfall methods:

(i) Deal by deal method. (2 marks)

(ii) Total return method 1. (2 marks)

(iii) Total return method 2. (2 marks)

(iv) Assume in the second year, another investment of Sh.25 million is exited and results in a loss of Sh.4 million. Assume the deal by deal method and a clawback with annual true-up apply.

Determine whether the general partner (GP) must return any former profits to the limited partners (LPs). (2 marks)

(Total: 20 marks)

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QUESTION FIVE

(a) Summarise **FOUR** economic roles of structured products. (4 marks)

(b) Analyse **THREE** major types of crowd-funding in the context of alternative investments. (6 marks)

(c) Brian Kochei recently completed a Monte Carlo simulation analysis of a collateralised mortgage obligation (CMO) tranche. Brian's analysis includes six equally weighted paths, with the present value of each calculated using four different discount rates as shown in the following table:

Representative path	Present value if spread is 50 basis points	Present value if spread is 60 basis points	Present value if spread is 70 basis points
1	70	68	66
2	73	70	68
3	68	66	64
4	71	69	68
5	77	75	73
6	75	73	71

The actual market price of the CMO tranche being valued is 70.17.

Required:
The option adjusted spread (OAS) of the tranche. (4 marks)

(d) Consider the collateralised mortgage obligation (CMO) tranches shown in the following table:

Tranche	Option adjusted spread (OAS) (bps)	Z – spread (bps)	Effective duration
A	68	85	2.60
B	71	91	2.90
C	73	136	3.25

Required:

(i) Option cost of each tranche. (3 marks)

(ii) Identify the most expensive tranche and justify using **TWO** reasons. (3 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 20 August 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Highlight **FOUR** motivating goals for a pension fund in rendering alternative investment. (4 marks)

(b) Explain **THREE** types of alternative investment structures. (6 marks)

(c) Sauti Endowment Fund is a fund that supports education in Kenya by way of scholarship and bursaries. Sauti invests in equity securities to generate income for its various projects. The board of directors has chosen a mortgage backed securities (MBS) for inclusion in the endowment portfolio. After surveying the mortgage backed security market, the management has selected four MBS to present to the board investment committee as provided below:

MBS	Initial principal Sh."million"	Coupon rate (%)	Underlying maturity (Years)	Nominal spread(%)	Optional adjusted spread (OAS) (%)	Z–spread (%)
Wax	500	7.0	30	1.21	0.28	0.79
Xero	350	7.8	25	1.43	0.49	1.16
Yellow	450	7.2	20	1.62	0.31	1.12
Zoro	380	8.0	30	1.59	0.40	1.14

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Required:

(i) The single monthly mortality (SMM) rate for MBS Xero for month 20 using 200 Public Securities Association (PSA) standard prepayment model. (3 marks)

(ii) The outstanding principal of MBS-Zoro is Sh.366 million at the beginning of month 20 and the total mortgage principal payment for the month is Sh.840,000.

Calculate the expected prepayment for month 20 using 125 PSA. (3 marks)

(iii) Explain which MBS will add the most value relative to the risk associated with the security, assuming the effective durations of the MBS are approximately the same. (2 marks)

(iv) Discuss how gross domestic product (GDP) growth will increase the rate of prepayments on any of the MBS. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain **FOUR** benefits of crowdfunding to an investor. (4 marks)

(b) A financier is willing to lend a 10% interest only loan on a property as long as the debt service coverage ratio (DSCR) is at least 1.6 times and the loan-to-value ratio does not exceed 80%. The property has just been appraised for Sh.15 million and the net operating income is Sh.2 million.

Required:

(i) Calculate the maximum loan amount. (3 marks)

(ii) Compute the equity dividend rate assuming that the property is purchased for the appraised value. (2 marks)

(iii) Calculate the leveraged internal rate of return (IRR) if the property is sold after 8 years for Sh.18 million. (3 marks)

(c) A hedge fund has the following fee structure:

- Annual management fee based on year-end net asset value (NAV): 2%
- Incentive fee: 20%
- Hurdle rate before incentive fee collection starts: 4%
- Current high-water mark: Sh.610 million
- The fund has a value of Sh.583.1 million at the beginning of the year. After one year, it had a value of Sh.642 million before fees.

Required:

(i) Management fees for the year. (2 marks)

(ii) Justify whether the fund manager is entitled to receive any incentive fees. (2 marks)

(iii) Incentive fees payable, if any. (2 marks)

(iv) Net return for the hedge fund after fees. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Zack Rega, a financial analyst, observed the following futures prices for an agricultural commodity trading on a global futures market:

Commodity	January 2024	February 2024	March 2024	April 2024
30 December 2023	115.96	122.08	124.18	124.70
31 January 2024		136.70	135.84	137.48
28 February 2024			122.20	122. 82
31 March 2024				121.14

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Required:

(i) Futures return for January 2024. (2 marks)

(ii) Spot return for February 2024. (2 marks)

(iii) The roll return for March 2024. (2 marks)

(b) The following information relates to three mortgages that comprise the entire pool in a collateralised mortgage obligation (CMO) Z-structure:

Mortgage	Interest rate (%)	Beginning balance (Sh.)	Ending balance (Sh.)	Original term (months)	Number of months to maturity (months)
A	2.50	300,000	238,000	240	180
B	3.30	420,000	380,000	600	480
C	2.80	100,000	87,000	288	240

Required:

(i) Calculate the weighted average coupon rate for the mortgage backed security. (2 marks)

(ii) Calculate the weighted average maturity for the mortgage backed security. (2 marks)

(iii) Describe one reason as to why an investor would choose a collateralised mortgage obligation Z-structure. (2 marks)

(c) The following information relates to collateralised debt obligation (CDO) transactions:

1. The CDO is Sh.200 million structure and the assets purchased will be Sh.200 million.
2. The collateral consists of bonds that all mature in 8 years and the coupon rate for every bond is the 8-year treasury rate plus 600 basis points.
3. The senior tranche comprises 75% of the structure (Sh.150 million) and pays interest based on the following coupon formula: LIBOR plus 90 basis points.
4. There is only one junior tranche worth Sh.30 million with a fixed coupon rate. The coupon rate is the 8-year treasury rate plus 300 basis points.
5. The asset manager enters into an agreement with counterparty in which it agrees to pay the counterparty a fixed rate each year equal to the 8-year treasury rate plus 120 basis points and receive LIBOR. The notional amount of the agreement is Sh.150 million.

Required:

(i) The amount of equity tranche in this CDO. (1 mark)

(ii) Assume that the 8-year treasury rate at the time the CDO is issued is 6%. Assuming no defaults, determine the cash flow for each year and how it is distributed. (6 marks)

(iii) Ignoring the asset management fee, calculate the amount available each year for the equity tranche. (1 mark)

(Total: 20 marks)

QUESTION FOUR

(a) Enumerate **FOUR** buy-side participants in the alternative investing environment. (4 marks)

(b) Describe **THREE** features of fund structures. (6 marks)

(c) A property was let for a five-year term three years ago at Sh.40 million. Rent reviews occur every five years. The estimated rental value in the current market is Sh.60 million and the all risks yield on comparable fully let properties is 6%. A lower rate of 5% is considered appropriate to discount the term rent because it is less risky than the market rent.

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Required:

Calculate the value of the property. (3 marks)

(d) Robert Kibet is considering his firm investment in KRR Holdings, a private equity fund. Selected details on KRR Holdings fund include the following:

- At the end of December 2023, cumulative paid-in capital was Sh.98 million, cumulative distributions paid-out to limited partners (LPs) were Sh.28 million and the year-end net asset value (NAV), before and after distributions was Sh.170.52 million and Sh.131.42 million respectively.
- Robert Kibet estimates that the fund's net asset value (NAV) before distributions will be Sh.242.32 million at the end of December 2024.

Required:

(i) Explain the term "Total Value to Paid-In (TVPI) capital". (2 marks)

(ii) Determine the Total Value to Paid-In (TVPI) capital for KRR Holdings at the end of December 2023. (5 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Evaluate **THREE** categories of hedge fund strategies. (6 marks)

(b) Below are the results of a Monte Carlo simulation analysis using eight representative paths for two tranches of a collateralised mortgage obligation (CMO) deal, Tranches M and N:

Representative path	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present value of path for:								
Tranche M	60	55	90	105	110	50	48	70
Tranche N	86	85	89	91	84	92	87	86

One of the tranches is a Planned Amortisation Class (PAC) and the other is a support tranche.

Required:
Using a suitable justification, identify:

(i) The PAC tranche. (2 marks)

(ii) The support tranche. (2 marks)

(c) Duma Ltd. is a startup specialising in mobile applications. The company's founders believe that they can sell the company for Sh.50 million in four years. They need Sh.7 million in capital now and the founders wish to hold one million ordinary shares. The venture capital investor firm decides that given the high risk of this company, a discount rate of 45% is appropriate.

Required:
Using the net present value (NPV) venture capital method and assuming a single financing round, calculate:

(i) The post-money valuation. (2 marks)

(ii) The pre-money valuation. (2 marks)

(iii) The ownership fraction for the venture capital firm. (2 marks)

(iv) The number of shares for the venture capital firm. (2 marks)

(v) The stock price per share. (2 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 23 April 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Discuss **THREE** elements of prediction markets. (6 marks)

(b) Suppose that the base case shifting interest percentage schedule for a closed-end home equity loan-backed security is as follows:

Years after issuance	Senior prepayment percentage
1 – 4	100%
5	90%
6	80%
7	50%
8	20%
After year 8	0%

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Required:

(i) If there are prepayments in month 36 of Sh.100,000, determine the amount of prepayment paid to senior tranche and subordinate tranches. (2 marks)

(ii) If there are prepayments in the 8th year after issuance of Sh.100,000, calculate the amount of prepayment which will be paid to senior tranche and subordinate tranches. (2 marks)

(iii) It there are prepayments in the 10th year after issuance of Sh.100,000, compute the amount of prepayment to be paid to senior tranches and subordinate tranches. (2 marks)

(c) An issuer is considering the following two collateralised mortgage obligation (CMO) structures:

Structure II

Tranche	Par amount (Sh. millions)	Coupon rate (%)
D	150	7.75
E	100	8.00
F	500	8.50

Tranches D-E are a sequence of planned amortisation class (PAC) Is and F is the support tranche.

Structure II

Tranche	Par amount (Sh. millions)	Coupon rate (%)
D	150	7.75
E	100	8.00
F	200	8.25
G	300	?

Tranches D-E are a sequence of PAC Is, F is a PAC II and G is a support tranche without a schedule.
In Structure II tranche G is created from tranche F in Structure I.

Required:

(i) Determine the coupon rate for tranche G assuming that the combined coupon rate for tranches F and G in Structure II should be 8.5%. (4 marks)

(ii) Explain the effect on the value and average life of tranches D-E by including the PAC II in Structure II. (2 marks)

(iii) Explain the difference in the average life variability of tranche G in structure II and tranche F in structure I. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Examine **FOUR** effects of variation in income tax conventions around the world on investments and investment decisions. (8 marks)

(b) Sh.200 million contribution was received from the limited partners to fund an investment. The terms of agreement included a 6% hurdle rate, a 100% catchup and an 80/20 carry split. The investment is sold by the fund in the second year for Sh.300 million.

Required:

Calculate the amount to be received by the following:

(i) Limited partners. (3 marks)

(ii) General partners. (3 marks)

(c) Marclus Wafula is analysing a potential investment in the leveraged buyout (LBO) of Mutomo Industries. He assesses the expected gain if he decides to purchase all the preference shares and 90% of the common equity in the LBO. Details of the LBO include the following:

1. The buyout requires an initial investment of Sh.10 million
2. Financing for the deal includes Sh.6 million in debt, Sh.3.6 million in preference shares that promises a 15% annual return paid at exit and Sh.0.4 million in common equity.
3. The expected exit value in six years is Sh.15 million, with an estimated reduction in debt of Sh.2.8 million over the six years prior to exit.

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Required:

Calculate the multiple of expected proceeds at exit to invested funds for the LBO investment. (6 marks)

(Total: 20 marks)

QUESTION THREE

(a) In relation to private equity, outline **FOUR** differences between venture capital and buyouts. (4 marks)

(b) Describe **FOUR** similarities between alternative investments and conventional investments. (8 marks)

(c) The monthly cash flow yield of a mortgage-backed security (MBS) is 0.8%.

Required:

(i) Bond equivalent yield. (2 marks)

(ii) State **TWO** assumptions of cash flow yield. (2 marks)

(d) John Omondi is considering a site to build either an apartment building or a shopping centre. Once construction is complete, the apartment building would have an estimated value of Sh.50 million and the shopping centre would have an estimated value of Sh.40 million. Construction costs including developer profit are estimated at Sh.45 million for the apartment and Sh.34 million for the shopping centre.

Required:

Calculate the highest and best use of the site. (4 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Explain **THREE** theories associated with commodities futures' returns. (6 marks)

(b) Consider a nine-month forward contract on a commodity that trades at a spot price of Sh.120. The commodity has market wide convenience yields of 4%, storage costs of 3% and financing costs of 8%.

Required:
The price of the nine-month forward contract on the commodity. (4 marks)

(c) Likoni Plaza is a 240,000 square foot high-rise apartment building located in the suburban area of the capital city. The building has an effective age of 12 years, while its economic life is estimated at 40 years. The building has a structural problem that is not feasible to repair as this may entail demolishing it completely. The elevation of the building requires replacement at a cost of Sh.10 million, which is expected to increase the value of the property by Sh.13 million. The bedrooms in each apartment are too squeezed and the floor plans are below par. As a result of poor designs, rent is Sh.4 million lower than the competing apartments.

When Likoni Plaza was originally built, it was located across the Street from an open field. Five years ago, a road construction company was given a permit to operate a quarry mine. Due to the noise and dust from the quarry, the negative impact on rent is estimated to be Sh.6 million a year. Vacancy rates have also increased significantly due to the recent construction of competing properties resulting in estimated loss of value of Sh.12 million. The cost to replace Likoni Plaza is estimated at Sh.4,000 per square foot plus a builder profit of Sh.50 million. The market value of the land is estimated at Sh.200 million. Appropriate capitalisation rate for this property is 8%.

Required:
Estimate the value of Likoni Plaza using the cost approach. (10 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Explain **FOUR** reasons for incorporating hedge funds into an investment programme. (4 marks)

(b) Analyse **THREE** biases in hedge fund databases. (6 marks)

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(c) The following information relates to two bonds:
1. XYZ bonds have a duration of 5.6 years and a convexity of 38.2.
2. Q bonds have a duration of 5.6 years and a convexity of 134.

Required:
Determine which bond is exposed to more interest rate risk when yield increases by 100 basis points. (3 marks)

(d) Consider a pass-through certificate with a maturity of 20 years and an average life of 12 years. Assume that the bond equivalent yield for this mortgage backed security (MBS) is 7.75% based on the prepayment assumption of 150 PSA. Suppose a 12-year corporate bond with a yield to maturity of 7.5% is also available.

The following table shows different periods with their respective maturities (YTM):

Maturity (years)	Yield to maturity (YTM)
5	6%
7	6.2%
9	6.6%
12	6.9%
20	7.2%

Required:
Compute the nominal spread for the mortgage backed security (MBS) and the corporate bond. (3 marks)

(e) The table below provides information about Delta Fund with a vintage year of 2021 and committed capital of Sh.195 million. The distribution waterfall calls for 20% carried interest when net asset value before distributions exceeds committed capital.

Year	Called-down Sh."million"	Management fees Sh."million"	Operating results Sh."million"
2021	30	0.45	-10
2022	25	0.83	55
2023	75	1.9575	75

Required:
Calculate the amount of carried interest for year 2023. (4 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 5 December 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Enumerate **FOUR** reasons why commodity returns may have low correlation with stock prices and bond prices. (4 marks)

(b) The current cash price of one barrel of Murban crude oil is Sh.9,000, while the four month future price is Sh.8,700 per barrel. The four month expected futures spot price is Sh.9,200 per barrel. The annual storage cost is 6% and the annual cost of funding is 5%.

Required:
Calculate the following:

(i) Implied convenience yield. (3 marks)

(ii) Total cost of carry. (3 marks)

(iii) Implied risk premium. (2 marks)

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(c) Usawa Fund is a hedge fund with a value of Sh.100 million at the beginning of the year. Usawa Fund charges 2% management fee based on assets under management at the beginning of the year and a 20% incentive fee with a 5% hurdle rate and uses a high water mark provision. Incentive fees are calculated on gains net of management fees. The end values before the fees are as follows:

Year 1 Sh.130 million
Year 2 Sh.135 million

Required:
Calculate:

(i) The total fees for year 1. (2 marks)

(ii) The net return for year 1. (2 marks)

(iii) The total fees for year 2. (2 marks)

(iv) The net return for year 2. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Summarise **FOUR** general categories of leveraged buyouts (LBO) that can create value. (4 marks)

(b) In relation to the environment of alternative investments:

(i) Explain the term “adverse selection”. (2 marks)

(ii) Describe **TWO** ways in which adverse selection can occur in alternative investments. (4 marks)

(c) The structure for an asset-backed security transaction is as follows:

Senior tranche	Sh.220 million
Subordinate tranche 1	Sh.50 million
Subordinate tranche 2	Sh.30 million

Additional information:

1. The value of the collateral for the structure is Sh.320 million.
2. Subordinate tranche 2 is the first loss tranche.

Required:

Calculate:

(i) The amount of overcollaterisation. (2 marks)

(ii) The amount of the loss for each tranche if losses due to defaults over the life of the structure total Sh.35 million. (2 marks)

(iii) The amount of the loss for each tranche if losses due to defaults over the life of the structure total Sh.85 million. (3 marks)

(iv) The amount of the loss for each tranche if losses due to default over the life of the structure total Sh.110 million. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Describe **FOUR** lessons learnt from historical evolution of alternative investments. (8 marks)

(b) Peter Kemoli has gathered the following values for distributions, contributions and net asset value for two private equity funds named PE Fund 1 and PE Fund 2 that belong to the vintage year 2016 stage focus buyout:

Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
	Sh.“million”	**Sh.“million”**	**Sh.“million”**	**Sh.“million”**	**Sh.“million”**	**Sh.“million”**	**Sh.“million”**
PE Fund 1	(500)	(800)	300	(1,000)	(600)	1,500	4,500
PE Fund 2	(1,800)	(1,200)	(800)	(200)	500	2,300	7,000

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Additional information:

1. Positive number correspond to years in which investors received net distributions.
2. Negative numbers correspond to years in which investors made net contributions and the figures for the year 2022 correspond to the net asset values (NAVs) of each of the two funds at the end of that year.

Required:

Calculate the following for the two funds:

(i) Interim internal rate of return. (6 marks)

(ii) The total value to paid-in-ratio (TVPI). (2 marks)

(iii) The distribution to paid-in ratio (DPI). (2 marks)

(iv) The residual value to paid-in ratio (RVPI). (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Describe **THREE** key elements of structured products. (6 marks)

(b) Kibet Waweru, the fund manager of Capital Fund Managers, is looking at the historical passthrough security. Kibet discovers the following:

- Mortgage balance in month 42 Sh.520,000,000
- Scheduled principal payment in month 42 Sh.2,000,000
- Prepayment in month 42 Sh.4,900,000

Required:

(i) The single monthly mortality (SMM). (2 marks)

(ii) Interpret the single monthly mortality (SMM) computed in (b) (i) above. (1 mark)

(iii) Compute the conditional prepayment rate (CPR) for month 42. (2 marks)

(iv) Interpret the conditional prepayment rate (CPR) computed in (b) (iii) above. (1 mark)

(c) ABC Pension Fund is considering equity investment in real estate and two options are for consideration.

Option 1: Investment in a public equity real estate investment trust (REIT).
Option 2: Equity investment in a public real estate operating company (REOC).

The relevant data is presented below:

Option 1: REIT

Recent net operating income (NOI)	Sh.140 million
Non cash rents	Sh.5 million
Full year adjustment for acquisition	Sh.5 million
Other assets	Sh.50 million
Total liabilities	Sh.300 million
Current market price per share	Sh.125
Shares outstanding	15 million
Going in cap rate	7%
Net operating income (NOI) growth rate	2.50%

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Option 2: REOC

Expected adjusted funds from operations (AFFO) in year 8	Sh.13.5 million
Holding period	7 years
Present value of all dividends for 7 years	Sh.39.7 million
Shares outstanding	1 million
Cap rate	7%
Growth rate (from year 8)	2.50%

Additional information:

The REOC terminal value at the end of seven years is to be based on a price-to-AFFO multiple of 12 times.

Required:

(i) Determine whether the REIT is properly valued using the Net Asset Value approach. (4 marks)

(ii) Calculate the estimated value per share for the REOC using the discounted cash flow approach. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Enumerate **THREE** advantages and **THREE** disadvantages of peer to peer lending. (6 marks)

(b) The coupon curve of prices for agency passthrough as of the end of a reporting period are presented below:

Coupon (%)	**Price (Sh. per Sh.100 par)**
3.0	101.0000
3.5	103.9688
4.0	106.4063
4.5	108.3750
5.0	110.5625

An investor currently holds a 4% agency passthrough security.

Required:
Calculate the current coupon duration for a 100 basis point rate shock. (2 marks)

(c) A property has been appraised for Sh.5 million and is expected to have net operating income (NOI) of Sh.400,000 in the first year. The lender is willing to make an interest only (IO) loan at an interest rate of 8% as long as the loan to value ratio does not exceed 80% and debt service coverage ratio (DSCR) is at least 1.25. The balance of the loan will be due after seven years.

Required:
Compute the following:

(i) The amount of loan that can be raised. (3 marks)

(ii) The equity dividend rate or cash on cash return assuming the property is purchased at its appraised value. (3 marks)

(d) An office building was leased six years ago at Sh.2,000,000 a year. The next review occurs in two years. The estimated rental value in two years based on current market conditions is Sh.3,000,000. The contract term rent is discounted at 7% and the incremental rent is discounted at 8%.

Required:
Calculate the value of the office building today using the layer method. (6 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 22 August 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Examine **TWO** ways in which moral hazard could manifest itself in alternative investments. (4 marks)

(b) Evaluate **THREE** features of fund structures as used in alternative investments. (6 marks)

(c) Bob Real estate investors are planning to sell a warehouse and have collected the following information as depicted in Table 1 below:

Table 1:

		Comparable transactions		
Unit of comparison	**Subject property**	**1**	**2**	**3**
Size in square feet	60,000	80,000	40,000	70,0000
Age in years	4	8	3	4
Physical condition	Average	Good	Average	Poor
Location	Prime	Prime	Secondary	Prime
Sale date, months ago		8	20	14
Sales price		Sh.18,000,000	Sh.9,000,000	Sh.16,000,000

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Additional information:

1. Each adjustment to be based on unadjusted sales price of the comparable.
2. **Depreciation:** The property depreciates at a rate of 5% per annum.
3. **Condition adjustment:** Good - 5%, average - none, poor - 5%.
4. **Location adjustments:** Prime -none, secondary -10%.
5. Over the past 24 months, the sales prices have been appreciating at a rate of 0.5% per month.

Required:

Estimate the value of the warehouse using the sales comparison approach. (10 marks)

(Total: 20 marks)

QUESTION TWO

(a) Argue **TWO** cases why alternative investments are complement to traditional investments. (4 marks)

(b) In relation to crowd funding, highlight **TWO** risks of the crowdfunding to:

(i) The investors. (2 marks)

(ii) The borrowers. (2 marks)

(c) Usawa hedge fund has a management and incentive fee of 1.5% and 30% respectively. The fund has no hurdle rate and has a net asset value (NAV) of Sh.200 million at the start of the year. At the end of the year, the net asset value (NAV) after the fees was Sh.270 million.

Additional information:

1. The management fees are computed at the end of the year.
2. There are no redemption or subscription fees.

Required:
Calculate:

(i) The incentive fees. (2 marks)

(ii) The management fees. (2 marks)

(iii) The ending net asset value (NAV) before fees. (2 marks)

(d) Kalahari Ltd. has a current market value of Sh.65 million and has an outstanding debt of Sh.22.5 million. A leveraged buyout firm (LBO) recognises certain inefficiencies in Kalahari Ltd. and offers to purchase the outstanding equity and payoff the outstanding debt for Sh.100 million. After the elimination of the operating inefficiencies at Kalahari Ltd., the earnings before interest, tax, depreciation and amortisation (EBITDA) increases from Sh.9.5 million to Sh.14 million per year. All the free cash flows will be used to pay off the debt of Sh.77.5 million to a zero balance in eight years' time. After eight years, the firms EBITDA is expected to grow at a constant rate of 4% per annum.
The firm's discount rate is 14% per annum.

Required:
Calculate:

(i) The value of Kalahari Ltd. (2 marks)

(ii) The compounded annual return for the LBO. (4 marks)

(Total: 20 marks)

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QUESTION THREE

(a) Jayson Mwenda is an investor of mortgage backed securities and asset backed securities. He is concerned that the decline in interest rates will impact the cash flows of the following securities:

1. Home equity Asset Backed Securities (ABS).

2. Planned Amortisation Class (PAC) collateralised mortgage obligation (CMO).

Required:
Describe the impact on the cash flows for each of the above securities. (4 marks)

(b) Discuss **THREE** differences between infrastructure and private equity investments as an alternative asset. (6 marks)

(c) The general partner for the private equity fund charges a management fee of 2% and carried interest of 20% using the first total return method. The total committed capital for the fund was Sh.200 million. The following figures shown below are in "shillings millions" and NAV is Net Asset Value.

Year	Capital called down	Paid-in capital	Management fees	Operating results	NAV before distributions	Carried interest	Distributions	NAV after distribution
2017	60	60	1.2	-15	43.8	?	-	43.8
2018	20	80	1.6	-20	42.2	?	-	42.2
2019	10	90	1.8	30	80.4	?	-	80.4
2020	20	110	2.2	50	148.2	?	30	118.2
2021	25	135	2.7	70	210.5	?	50	158.4
2022	10	145	?	120	?	?	90	?

Required:
Compute:

(i) The management fees for the year 2022. (1 mark)

(ii) The year carried interest is first paid and justify your answer. (1 mark)

(iii) The net asset value (NAV) before distribution for the year 2022. (2 marks)

(iv) The carried interest for the year 2022. (2 marks)

(v) The net asset value (NAV) after distributions for the year 2022. (2 marks)

(vi) The distributed to paid in (DPI) for the year 2022. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Describe **THREE** reasons why commodities should help diversify a portfolio of traditional assets as a form of alternative investments. (6 marks)

(b) The spot price per bushel of a commodity is Sh.1,050. The total cost of carry per month is as follows:

Storage costs per month	Sh.8 per bushel
Insurance per month	Sh.3 per bushel
Spoilage rate per month	0.50%
Financing rate per month	0.50%

Additional information:
1. The transport costs to and from storage are Sh.5 each.
2. The commodity is stored for 4 months.

Required:
Calculate the break-even futures price for the commodity. (4 marks)

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(c) Tranche M is a sequential pay structure with a par value of Sh.73 million and a coupon rate of Sh.7.5%. The tranche has been split to create a floater of Sh.13 million.

Required:
(i) Calculate the cap rate for the inverse floater if the coupon rate for the floater is 1 Month secured overnight financing rate (SOFR) plus 2%. (3 marks)

(ii) Calculate the cap rate on the floater assuming the coupon rate for the floater is 1 month SOFR + 2 % and a floor is imposed on the inverse floater as zero. (2 marks)

(d) Consider a Monte Carlo simulation analysis of a collateralised mortgage obligation (CMO) tranche with 6 different weighted rates. The market value of the tranche is Sh.80.44 million.

Representative Path	Path-Weight %	If spread is 65 bps	If spread is 70 bps	If spread is 75 bps
1	18	80	78	76
2	15	82	80	77
3	20	78	75	74
4	9	81	78	77
5	23	88	86	85
6	15	85	84	81

Required:
(i) Calculate the theoretical values for each of the three spreads. (4 marks)

(ii) Determine the option adjusted spread (OAS) of the tranche. (1 mark)

(Total: 20 marks)

QUESTION FIVE

(a) Examine **THREE** parties that are involved in asset securitisation. (6 marks)

(b) Highlight **THREE** types of private investments in public equity (PIPE). (3 marks)

(c) An investor is considering the purchase of an existing office building approximately five years old. The building when constructed was estimated to have an economic life of 50 years and the building to value ratio was 80%. Based on current cost estimates, the structure would cost Sh.500 million to reproduce today. The building is expected to continue to wear out evenly over the 50-year period of its economic life. Estimates of other economic costs associated with the improvement are as follows:

Repairable physical depreciation	Sh.30 million to repair
Functional obsolescence (repairable)	Sh.20 million to repair
Functional obsolescence (non-repairable)	Sh.2.5 million per year rent loss

Additional information:

1. The land value in the area is Sh.100 million.
2. The discount rate for any deferred outlays or cost is 12% per year.

Required:

Calculate the estimated value for the property. (5 marks)

(d) Wetu Ltd. has decided to pool two bonds in order to create a collaterised debt obligation (CDO) structure with two tranches. Each bond has a notional value of Sh.150 million, a probability of default of 8% and a recovery of 0% in the event of default. The resulting CDO structure has two tranches-senior and junior, each with a notional value of Sh.150 million. The default correlation for the bond is 0.

Required:

Determine the expected amount to be received by:

(i) Senior tranche. (3 marks)

(ii) Junior tranche. (3 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 25 April 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) In the commodities market, some possible forward market term structures are observed, according to the relationship between the expected future spot price and the current forward price and also by the relationship between the current spot price and the current forward price.

In relation to the above statement, explain the following possible forward market term structures:

(i) Backwardation. (1 mark)

(ii) Normal backwardation. (2 marks)

(iii) Contango. (1 mark)

(iv) Normal contango. (2 marks)

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(b) Fanishi Fund is a hedge fund with a committed capital of Sh.500 million and carried interest of 25%. An investment of Sh.200 million is made. Later in the year, the firm exits the investment and earns a profit of Sh.110 million.

Required:
Determine whether the general partner receives any interest using the following waterfall distribution methods:

(i) Deal by deal method. (2 marks)

(ii) Total return method 1. (2 marks)

(iii) Total return method 2. (2 marks)

(c) The table below shows data from a sequential pay Collateralised Mortgage Obligation (CMO) tranches of Hakika Limited:

Tranche	**Par Amount Sh. "000"**	**Coupon rate (%)**
A	194,500	7.5
B	36,000	7.5
C	96,500	7.5
D	73,000	7.5
Total	400,000	

Additional information:
Tranche C had been split to create a floater with a principal of Sh.80,416,667 and an inverse floater with a principal of Sh.16,083,333.

Required:

Compute:

(i) The capitalisation rate for the inverse floater assuming the coupon rate for the floater is 1 month LIBOR plus 1%. (6 marks)

(ii) The capitalisation rate on the floater assuming that the coupon formula for the floater is 1 month LIBOR plus 1% and a floor is imposed on the inverse floater of zero. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Analyse **FOUR** benefits of incorporating alternative investments in a portfolio. (4 marks)

(b) Describe **FOUR** legal documents used in establishing alternative investments partnerships. (4 marks)

(c) The following is the mortgage pool held by Nyumba Bora Finance Corporation in the year 2022:

Loan	**Outstanding mortgage balances Sh."000"**	**Mortgage rate (%)**	**Months remaining**
1	630,000	7.75	300
2	570,000	8.75	285
3	450,000	8.25	292
4	400,000	8.00	310
5	600,000	7.50	280
Total	2,650,000		

Required:

(i) The weighted average coupon (WAC) rate for Nyumba Bora Finance Corporation mortgage pool. (2 marks)

(ii) The weighted average maturity (WAM) for Nyumba Bora Finance Corporation mortgage pool. (2 marks)

(d) The spot price of gold is Sh.228,600 per ounce. The current continuously compounded interest rate is 4%. A 6-month forward contract on gold currently trades at Sh.230,560 per ounce.

Required:

(i) Determine whether the contract is fairly priced. (2 marks)

(ii) Explain the steps to undertake the arbitrage opportunity in (d) (i) above, if any. (4 marks)

(iii) Calculate the arbitrage profit. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Explain the following types of mortgage structures:

(i) Ballon payment loan. (1 mark)

(ii) Interest-only mortgage loans. (1 mark)

(iii) Fixed amortised mortgage. (1 mark)

(iv) Variable rate mortgage. (1 mark)

(b) Pendo and company are real estate developers who invest in undeveloped land. Recently, they discovered a piece of underdeveloped land which they wish to invest in. The developers would like to estimate the value of the option to develop the land using binomial option pricing model approach. They intend to use a single-period binomial model. The risk free rate of return is 0%. They forecast that if the economy weakens, the cost of construction will be Sh.2,000,000, but the value of finished project will be Sh.1,750,000. If the economy strengthens, the cost of construction will increase to Sh.2,500,000, but the value of the completed project will be Sh.3,400,000. The developers have found out that comparable finished projects in the region are selling for Sh.2,080,000.

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Required:

(i) The value of the call option to develop the land. (4 marks)

(ii) The value of the call option assuming the construction cost are not positively correlated with improved property, but fixed to Sh.2,100,000 with original expected value. (1 mark)

(iii) The value of the call option assuming the economy strengthens and the property is worth Sh.4,000,000 with the original construction cost. (1 mark)

(c) A recently finished 50-unit estate in Nairobi rents at Sh.100,000 per unit per month for a five-bedroom house with a servant quarter. The estate currently has 45 units rented. Operating expenses, including income taxes, insurance, maintenance and advertising are 40% of effective gross income. The property manager is paid 10% of effective gross income. Other incomes from parking and laundry is expected to average Sh.500,000 per rented unit per year. Capitalisation rate on comparable properties around the area is 5%.

Required:

(i) The estimated net operating income (NOI) in the first year. (4 marks)

(ii) The estimated value of the estate. (1 mark)

(d) Mwazo Ltd. is a startup company specialising in mobile applications. The company's founders believe that they can sell the company for Sh.100,000,000 in four years time. Mwazo Ltd. requires Sh.14,000,000 in capital now, and from their projections after 4 years, they will want to hold 2,000,000 shares in the company. Azilisha Venture, a capitalist investor firm, decides that given the high risk of Mwazo Ltd., a discount rate of 45% is appropriate.

Required:

Calculate for Mwazo Ltd.:

(i) The post-money valuation. (1 mark)

(ii) The pre-money valuation. (1 mark)

(iii) The ownership fraction for the venture. (1 mark)

(iv) The number of shares for the venture capital. (1 mark)

(v) The stock price per share. (1 mark)

(Total: 20 marks)

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QUESTION FOUR

(a) Summarise **FIVE** stages associated with life cycle of a venture capital fund. (5 marks)

(b) Highlight **THREE** advantages and **THREE** disadvantages of reward-based crowdfunding. (6 marks)

(c) Tutor Private Equity (PE) Fund invest in private credit and distressed debt investments has invested Sh.20 million. The Fund expects to earn an average return of 18% per year over a holding period of three years. The Fund charges a management fee of 2% of committed capital per year and a carried interest of 20% on profits above a hurdle rate of 12%. At the end of the holding period, the portfolio was sold for Sh.35 million.

Additional information

1. Management fees are calculated on committed capital. For Tutor Private Equity Fund, committed capital is equal to invested capital.

2. The hurdle rate is applied on a deal-by-deal basis, not on the overall portfolio.

Required:

Calculate:

(i) The total management fees charged by the Fund over the holding period. (2 marks)

(ii) The total carried interest earned by the fund at the time of sale. (3 marks)

(iii) The net internal rate of return (IRR) earned by the Fund investors. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Distinguish between "zero volatility spread (Z-Spread)" and "option adjusted spread (OAS)" in relation to mortgage backed and asset backed securities. (4 marks)

(b) In relation to hedge funds:

(i) Identify **THREE** primary elements of hedge funds. (3 marks)

(ii) Evaluate **THREE** reasons responsible for the growth of the hedge fund industry. (6 marks)

(c) The following information relates to the coupon curve of prices for a pass through security for some months:

Coupon (%)	**Price**
6	85.19
7	92.06
8	98.38
9	103.34
10	107.28
11	111.19

Required:
Compute the coupon curve duration for the 8% coupon pass through security. (3 marks)

(d) A pension fund has been pursuing an investment strategy that tracks the stock market index that had a return of 8.6% with a standard deviation of 12%. The pension fund is considering an investment in a hedge fund with a standard deviation of 5.5% and expected return of 6.7%. The correlation between the stock market index and the hedge fund is 0.62 and the risk free return is 2.8%.

Required:
(i) Calculate the hurdle rate on the hedge fund. (3 marks)

(ii) Advise the pension fund whether it should add hedge fund to its portfolio. (1 mark)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 6 December 2022. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Outline **FOUR** characteristics that distinguish separately managed accounts from investment funds. (4 marks)

(b) Explain **THREE** types of alternative investment structures. (6 marks)

(c) The following information relates to a real estate property owned by Hamza Holding Ltd.:

Building size	100,000 square feet
Replacement cost	Sh.250 per square foot
Actual age	10 years
Effective age	15 years
Total economic life	25 years
Economic obsolescence	Sh.800,000
Land market value	Sh.11,500,000

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Required:
Using the cost approach, determine the value of Hamza Holding Ltd.'s property. (4 marks)

(d) A single-tenant office building was leased six years ago at a cost of Sh.12,000,000 per year. The next rent review occurs in two years. The estimated rental value (ERV) in two years based on current market conditions is Sh.15,000,000 per year. The all risks yield (cap rate) for comparable fully let properties is 10%. Because of lower risk, the appropriate rate to discount the term rent is 8%.

Required:
The value of the office building using term reversion method. (6 marks)
(Total: 20 marks)

QUESTION TWO

(a) Highlight **FOUR** areas of regulation of hedge funds. (4 marks)

(b) Explain **THREE** classification of participants in the alternative investments environment. (6 marks)

(c) A company's founders believe that their company can be sold for Sh.60 million in four years. The company needs Sh.6 million in capital now and Sh.3 million in three years. The entrepreneurs want to hold one million shares. The venture capital firm uses a discount rate of 20% over all four years.

Required:

(i) The post-money valuation at the time of second round financing. (1 mark)

(ii) The post-money valuation at the time of first round financing. (2 marks)

(iii) The required fractional ownership for the second round investors. (1 mark)

(iv) The fractional ownership for the first round investors after dilution by the second round investors. (2 marks)

(v) The share price after the first round of financing. (2 marks)

(vi) The share price after the second round of financing. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Outline **THREE** differentiating characteristics of commodity indexes from other indices. (3 marks)

(b) Enumerate **FOUR** requirements that must be met by a special purpose vehicle (SPV) in order to give assurance that its assets are free from bankruptcy risk. (4 marks)

(c) Consider a nine month forward contract on a commodity that trades at a spot price of Sh.100. The commodity has market wide convenience yields of 3%, storage costs of 2% and financing costs of 7%.

Required:

The price of a ten-month forward contact. (3 marks)

(d) An issuer is considering the following two collateralised mortgage obligation (CMO) structures:

Structure I:

Tranche	Par mount (Sh.million)	Coupon rate (%)
A	150	6.50
B	100	6.75
C	200	7.25
D	150	7.75
E	100	8.00
F	500	8.50

Tranche A – E are a sequence of planned amortisation class (PAC) interest only (IO) and F is the support tranche.

Structure II:

Tranche	Par mount (Sh.million)	Coupon rate (%)
A	150	6.50
B	100	6.75
C	200	7.25
D	150	7.75
E	100	8.00
F	200	8.25
G	300	??

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Tranche A – E are a sequence of planned amortisation class (PAC) interest only (IO), tranche F is a PAC II and tranche G is a support tranche without schedule.

Required:

(i) In structure II, tranche G is created from tranche F in structure I, calculate the coupon rate for tranche G assuming that the combined coupon rate for tranches F and G in structure II should be 8.5%. (6 marks)

(ii) Explain the effect on the value and average life of tranche A to tranche E by including the PAC II in structure II. (2 marks)

(iii) Explain the difference in the average life variability of tranche G in structure II and tranche F in structure I. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) (i) In relation to equity crowdfunding, outline **THREE** benefits of equity crowdfunding as a form of alternative investment. (3 marks)

(ii) Summarise **FOUR** risks associated with equity crowdfunding. (4 marks)

(b) An analysis of an agency CMO structure using Monte Carlo simulation model based on 12% volatility found the following:

Collateral	OAS basis points	Z – Spread basis points	Effective duration
Collateral	90	130	8.0
Tranche:			
PAC 1A	50	60	1.5
PAC 1B	70	80	3.0
PAC 1C	30	120	5.0
PAC 1D	30	150	9.0
PAC 11A	80	150	4.0
PAC 11B	20	280	6.0
Support S_1	35	165	11.0
Support S_2	50	190	14.0

Required:

(i) The option cost for PAC 1A, PAC IIA and support S_1. (3 marks)

(ii) The PAC tranches that is expensive in the deal on a relative value basis. (2 marks)

(iii) The support tranche which is expensive on a relative value basis.

[Hint: Support tranches are PAC IIA, PAC 11B, support S_1 and support S_2]. (2 marks)

(c) An investor is considering a Sh.100 million collateralised debt obligation (CDO) structure with the coupon rate to be offered at the time of issuance is shown below:

Tranche	Par value (Sh.)	Coupon rate
Senior	80,000,000	SOFR +70 basis points
Mezzanine	10,000,000	10 year Treasury rate plus 200 basis points
Subordinate/Equity	10,000,000	

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The collateral consist of bonds that all mature in 10 years and the coupon rate for every bond is the 10 year treasury rate plus 400 basis points. The investor enters into an interest rate swap agreement with another party with a notional amount of Sh.80 million in which he agrees to do the following:

1. Pay a fixed rate each year equal to the 10 year treasury rate plus 100 basis points.
2. Receive secured overnight financing rate (SOFR).

The 10 year treasury rate at the time the CDO is issued is 7%.
The asset management fee paid is Sh.634,000.

Required:

Calculate the annual return available to the subordinate/equity tranche. (6 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Highlight **FOUR** disadvantages of direct investing in an alternative investment. (4 marks)

(b) Assess **TWO** biases in hedge fund databases that appear to increase the return or decrease the risk of investing in hedge funds. (4 marks)

(c) The following collaterised mortgage obligation (CMO) structure is backed by 8% collateral:

Tranche	Par amount (Sh."million")	Coupon rate (%)
A	300	6.50
B	250	6.75
C	200	7.25
D	250	7.75

A client wants a notional interest only (IO) with a coupon rate of 8%.

Required:
Calculate the notional amount for this notional interest only CMO. (6 marks)

(d) The limited partners in a private equity fund make a Sh.200 million contribution in the first year to fund an investment. The terms of agreement provides for a 6% hurdle rate, a 100% catch-up and an 80/20 carry split. The investment is sold by the fund in the second year for Sh.300 million.

Required:
Determine the amount that is received by the following at the end of second year:

(i) Limited partners. (3 marks)

(ii) General partner. (3 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 2 August 2022. Morning paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Examine three return characteristics that differentiate traditional investments from alternative investments. (6 marks)

(b) Describe four types of alternative investments. (4 marks)

(c) Perminus Riungu is using the following information to analyse a potential investment in an industrial building:

Selected real estate investment trust (REIT) financial information as at 30 June 2022 is provided below:

	Sh."million"
Estimated 12 months cash net operating income (NOI)	40
Fund from operations (FFO)	30
Cash and cash equivalents	30
Accounts receivable	20
Debt and other liabilities	250
Non cash rents	5
Recurring maintenance type capital expenditures	10

Ordinary shares outstanding	10 million
Expected annual dividend next year (2023)	Sh.3.00
Dividend growth rate in 2024 and 2025	4%
Dividend growth rate (from 2026 into perpetuity)	3%
Assumed capitalisation rate	8%
Office subsector average price to funds from operators (P/FFO) multiple	12 times
Office subsector average price to adjusted funds from operations (P/AFFO)	20 times
The cost of equity capital	11%
Risk free rate	2%

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Required:
Calculate the value of Perminus Riungu's potential investment using:

(i) The net asset value (NAV) approach. (2 marks)

(ii) Price to funds from operations (FFO) approach. (3 marks)

(iii) Price to adjusted funds from operations (AFFO) approach. (2 marks)

(iv) Discounted cash flow approach. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain four investment characteristics of real estate investment trusts (REITs). (4 marks)

(b) The following information relates to a planned amortisation class (PAC) structure:

- Sh.100 million mortgage pool structure
- The weighted average coupon rate (WAC) is 8.125%
- The weighted average maturity (WAM) is 357 months.
- The pass through rate is 7.5%
- The seasoning factor is 3. This is the factor that accounts for the prepayment based on the season.
- The planned amortisation class public securities association (PSA) prepayment model speed is 90 : 90 PSA model.

Required:
The PAC cash flow for the first month. (8 marks)

(c) A single tenant office building was leased six years ago at Sh.2,500,000 per year. The next rent review occurs in two years. The estimated rental value in two years based on current market conditions is Sh.3,200,0000 per year. The contract term rent is discounted at 7% and the incremental rent is discounted at 8%.

Required:
The value of the office building today using the layer method. (4 marks)

(d) Faraja investors have invested in a mortgage with a Sh.10,000,000 principal balance outstanding. The scheduled monthly principal payment is Sh.28,610. The mortgage pool has a conditional prepayment rate (CPR) of 6% and the pool is seasonal.

Required:

(i) The single monthly mortality (SMM) rate. (1 mark)

(ii) The estimated prepayment for the month using the information in (d) (i) above. (1 mark)

(iii) The single monthly mortality rate (SMM) in month 10, assuming 175% Public Securities Association (PSA). (2 marks)

(Total: 20 marks)

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QUESTION THREE

(a) Discuss three roles of financial markets in alternative investments. (6 marks)

(b) A hedge fund has identified investment opportunities in the distressed debt-market due to the supply constraints after the global Covid-19 pandemic.

Required:
In relation to the above statement, evaluate four distressed debt investment strategies. (4 marks)

(c) A leveraged buyout (LBO) transaction is valued at Sh.1,000 million and has the following characteristics:

1. Exit occurs in five years time at a projected multiple of 1.80 of the company's initial cost.
2. It is financed with 60% debt and 40% equity.
3. The Sh.400 million equity investment is composed of:
   - Sh.310 million in preference shares held by the private equity firm
   - Sh.80 million in equity held by the private equity firm
   - Sh.10 million in equity held by the management equity participation
4. The preference shares are guaranteed a 14% compound annual return payable at exit.
5. The equity of the private equity firm is promised 90% of the company's residual value at exit after creditors and preference shares are paid.
6. Management equity receives the other 10% residual value.
7. By exit, the company will have paid off Sh.350 million of the initial Sh.600 million in debt using operating cash flow.

Required:
Calculate the following:

(i) The payoff of the company's claimants. (4 marks)

(ii) The internal rate of return for the equity claimants. (4 marks)

(iii) The payoff multiple for the equity claimants. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Explain three factors that could contribute to successful securitisation. (3 marks)

(b) A venture capital firm, Metro Ltd. is considering a 5 year expansion plan. The firm will require Sh.30 million in the first round of financing and a second round of financing three years later worth Sh.20 million to finance the expansion required at the exit. The firm is expected to be worth Sh.500 million after 5 years. The founders of Metro Ltd. will hold 10 million ordinary shares.

You are further informed that the relevant discount rates are 40% for the first year and 30% for the last two years.

Required:
The price per share of Metro Ltd. at the time of second round of financing. (8 marks)

(c) Consider a mortgage security with a base rate of 7.64% and an initial price of Sh.98,781. Its effective duration is based to a change in interest rates of 25 basis points.

Additional information:

1. Bond price when the yield declines Sh.99.949
2. Bond price when the yield increases Sh.97.542

Required:
The duration of the bond when the yield changes by 25 basis points. (2 marks)

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(d) The following information relates to a collateralised debt obligation (CDO):

1. The CDO is a Sh.200 million structures - the collateral will have an initial value of Sh.200 million.
2. The collateral consists of entirely of bonds with 15 years remaining until maturity and a coupon rate equal to the 15 year Treasury rate plus 350 basis points.
3. The senior tranche represents Sh.150 million (75% of the structures) and carries a floating - coupon rate equal to LIBOR plus 150 basis points.
4. There is one Sh.20 million mezzanine tranche, and it carries a fixed coupon equal to the Treasury rate at origination plus 175 basis points.
5. The manager of the trust has entered into an interest rate plus 125 basis points and receive LIBOR. The national amount for this swap is Sh.150 million.
6. The 15 year Treasury rate is 7.5% at the time of origination for this CDO.

Required:

(i) The interest received by the CDO from the collateral. (1 mark)

(ii) The interest received by the CDO from the swap counterparty. (1 mark)

(iii) The total interest paid by the CDO to the senior and mezzanine tranches. (2 marks)

(iv) The total interest paid by the CDO to the swap counterparty. (1 mark)

(v) The net cash flow to the equity tranche. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Assess three types of crowdfunding as a new form of alternative investment. (6 marks)

(b) Describe three arbitrage-based strategies used by hedge funds. (6 marks)

(c) Alex Mikoye is a portfolio manager for a commodity investment fund. He has observed that the recent global Covid-19 pandemic and the supply constraints has resulted in higher demand for commodities. He investigates trading opportunities in palm oil, a key ingredient in the production of cooking oil. The spot price is Sh.183,146 per tonne and the three month forward contract price is Sh.181,407 per tonne. He decides to implement a reverse cash and carry arbitrage to profit from the difference between the spot and forward market. He can borrow or lend cash at an interest rate of 5% and the lease rate for palm oil is 6%. These are continuously compounded interest rates. He believes that manufacturers will increase their inventories of palm oil in expectation of higher sale. This higher demand may increase the convenience yield in this market.

Required:

(i) Describe two components of the synthetic commodity position in this arbitrage. (2 marks)

(ii) Calculate Alex Mikoye's profit on a reverse cash and carry arbitrage in the palm oil market. (4 marks)

(iii) Explain how a higher convenience yield for palm oil would affect the no arbitrage price range for the forward price. (2 marks)

(Total: 20 marks)

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

TUESDAY: 5 April 2022. Morning paper. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings. Do NOT write anything on this paper.

QUESTION ONE

(a) Explain three major methods of analysis that distinguish alternative investment from traditional investments. (6 marks)

(b) Magnum Investment Limited was formed by a group of Sacco members for purpose of investing in real estate. The company is considering acquiring an office building within Central Business District (CBD) and later lease it out to earn rental income. The following information regarding the property is given below:

• Property type	Office building
• Property size	200,000 square feet
• Other income	Sh.75,000
• Vacancy and collection losses	5% of gross income
• **Operating expenses:**	
Utilities	Sh.350,000
Interest expenses	Sh.875,000
• Value per square foot	Sh.25
• Income tax rate	40%

Required:

(i) The net operating income (NOI) for the office building. (4 marks)

(ii) Given another property with a net operating income of Sh.450,000 and assuming a capitalisation rate of 9%, estimate the market value of the property using the direct capitalisation method. (2 marks)

(c) Intellectual property has a probability of a positive cash flow of 0.45. The required rate of return is 10% and its value is expected to decline by 3% per year.

Required:

The value of the intellectual property assuming its current cash flow is Sh.100 million. (2 marks)

(d) Examine three goals of alternative investments. (6 marks)

(Total: 20 marks)

QUESTION TWO

(a) Examine three outside service providers in alternative investments. (3 marks)

(b) Explain three characteristics of a hedge fund. (3 marks)

(c) A hedge fund has the following fee structure:

Annual management fee based on year end asset under management (AUM)	2%
Incentive fee	20%
Hurdle rate before incentive fee collection starts	4%
Current high-water mark (HWM)	Sh.610 million

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The fund has a value of Sh.583.1 million at the beginning of the year. After one year, it has a value of Sh.642 million before fees.

Required:
The net percentage return to an investor for the year. (4 marks)

(d) A financial analyst has gathered the following data for Kibetu properties, an office building:

Year	**1**	**2**	**3**	**4**	**5**	**6**
Net operating income (Sh.)	2,775,840	2,859,119	2,944,889	3,033,235	3,124,232	3,217,959

The financial analyst makes the following assumptions:

Investment holding period	5 years
Going in cap rate.	5.25%
Terminal cap rate	6.00 %
Discount rate	8%
Income/value growth rate	Constant

The property is financed through a loan whose terms are provided below:

1. Loan term of 5 years.
2. Interest rate of 5.75% interest only.
3. Maximum loan to value of 75%.
4. Minimum debt service coverage ratio of 1.5 times.
5. Kibetu property has 100,000 square feet.

The analyst further gathers sales comparison data for the property as shown below:

Variable	**Property**	**Comparison A**	**Comparison B**	**Comparison C**
Age (years)	10	5	12	25
Condition	Good	Excellent	Good	Average
Location	Prime	Secondary	Secondary	Prime
Sales price per square feet (psf)		Sh.415	Sh.395	Sh.400

Adjustments	**Comparison A**	**Comparison B**	**Comparison C**
Age (years)	-10%	2%	10%
Condition	-10%	0%	10%
Location	15%	15%	0%
Total adjustments	-5%	17%	20%

Required:

(i) The value of Kibetu Property using discounted cash flow method. (3 marks)

(ii) The value of the property using direct capitalisation method. (2 marks)

(iii) The value of the property using the sales comparison approach assuming equal weighting is assigned to each comparable. (2 marks)

(iv) The maximum loan amount on the property assuming an appraisal value of Sh.48 million. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Highlight three roles that are played by pooled fund managers. (3 marks)

(b) Romano Investment Limited is a private equity (PE) firm that specialises in buying and managing debt-distressed companies with a clearly defined exit strategy. The company is considering leveraged buyout (LBO) valued Sh.5 billion and which has the following characteristics:

1. Exit occurs in five years at a projected multiple of 1.6 of the firm's initial cost. It is financed by debt and equity in the proportion of 60% and 40% respectively.

2. The Sh.2 billion equity investment is composed of:
   - Sh.1,550 million in preference shares held by Romano Limited.
   - Sh.400 million in equity shares held by Romano Limited.
   - Sh.50 million in equity held by management equity participation.
3. Preference shares are guaranteed at a 12.5% compound annual return payable at exit.
4. The equity of Romano Limited is promised 95% of the firm's residual at exit creditors and preference shares are paid. Management equity receives the other 5% residual value.
5. By exit, Romano Limited will have paid off Sh.1.75 billion of the initial Sh.3 billion in debt using operating cash flows.

Required:
The payoff multiple for Romano Investment Company as the equity claimants. (8 marks)

(c) Summarise four limitations of asset securitisation to both the issuer and the investor respectively. (4 marks)

(d) On 1 January this year, renovation works began on a shopping centre. By end of the year, the net operating income (NOI) is forecasted at sh. 6 million. Without renovations, the NOI would have been Sh.10 million. You are further informed that after this year, the NOI is expected to increase by 4% per annum and the investors require a 12% rate of return.

Required:
Assuming all renovations are completed by the sellers at their expense, estimate the value of the shopping center as of the beginning of this year. (5 marks)

(Total: 20 marks)

QUESTION FOUR

(a) An investments manager is considering a collaterised mortgage obligation (CMO) structure. The structure has three tranches. The tranches are A, B and C. Tranche C is an accrual tranche that accrues coupon interest monthly. For tranches A and B, the coupon rate is paid to each tranche each month and principal payments are first paid to tranche A, then to tranche B.

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The coupon rate and the amount outstanding are shown below:

Tranche	Coupon rate	Par amount outstanding (Sh. "million")
A	6%	3
B	7%	8
C	8%	30

Based on some prepayment rate, the projected principal payments (prepayments plus scheduled principal repayment) for the next 10 months for the collateral underlying this deal are as follows:

Month	Scheduled principal repayment plus prepayments
	Sh.
1	520,000
2	510,000
3	490,000
4	450,000
5	448,000
6	442,000
7	410,000
8	405,000
9	400,000
10	396,000

Required:

(i) Determine the principal repayment, interest and cash flow for tranche A. (8 marks)

(ii) Calculate the average life for tranche A. (4 marks)

(iii) Explain the impact of the accrual tranche on the average life tranche A. (1 mark)

(b) In valuing mortgage backed securities (MBS) and asset backed securities (ABS) using the Monte Carlo simulation model, determine the following:

(i) The assumption that must be made in generating the path of short-term interest rates. (1 mark)

(ii) Explain why the paths of short-term interest rates are adjusted. (2 marks)

(iii) The assumption that must be made while determining the path of refinancing rates. (1 mark)

(c) The coupon curve of prices for a passthrough security for a particular month is provided below:

Coupon	Price
10%	102.60
11%	105.25
12%	106.19

Required:

Determine the coupon curve duration for the 11% coupon passthrough. (3 marks)

(Total: 20 marks)

QUESTION FIVE

(a) In the commodity market, arbitrage is more complicated for commodity forwards than for financial forwards.

Required:

Cite two reasons why commodity forwards are more complicated than for financial forwards: (4 marks)

(b) The spot price of gold is currently at Sh.700 per oz. The current continuously compounded interest rate is 4%. A 6-month forward contract on gold currently trades at Sh.725.

Required:

Using suitable computation determine whether arbitrage opportunity exist. (3 marks)

(c) As a recent ICIFA graduate, you have been invited to a conference organised by the Summit of Governors which is being held to address the plight of unemployment among the youth especially at the County level. The conference's theme is dubbed "Financial inclusion among the unbanked youth" and you have been asked to handle one of the thematic areas which is crowd funding.

Required:

If you have decided to engage the forum on peer to peer lending, illustrate briefly how the concept works, challenges that could be expected and what would be the key takeaways that you would expect your audience to leave with. (7 marks)

(d) Venture capital investing has several investments characteristics, some of which are common to alternative investments, but many of them are unique.

Required:

In light of the above statement, outline six investments characteristics of venture capital. (6 marks)

(Total: 20 marks)

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Present Value Interest factor of 1 Received at the End of *n* Periods at r Percent:

$PVIF_{r,n} = 1 / (1+r)^n = (1+r)^{-n}$

	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0558	0.0330
	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0446	0.0254
	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	*
	0.7059	0.5096	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0138	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
	0.6391	0.4028	0.2644	0.1712	0.1113	0.0727	0.0476	0.0313	0.0207	0.0137	0.0091	0.0061	0.0041	0.0027	0.0019	0.0013	*	*	*	*

Present Value Interest factors for Annuity of 1 Discounted at r Percent for *n* Periods:

$PVIFA_{r,n} = [1 - 1/(1+r)^n]/r$

	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9964	3.3330
	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2315	4.9966	4.1659	3.9985	3.3332
	36.095	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9998	3.3333

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CIFA ADVANCED LEVEL

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 16 December 2021. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Examine three buy side participants involved in alternative investments. (6 marks)

(b) Describe four main classifications of hedge fund strategies. (4 marks)

(c) A 12 year old industrial property is being valued using the cost approach. The appraiser feels that it has an effective age of 15 years based on its current condition. For example, there are cracks in the foundation that are not feasible to repair (incurable physical depreciation). That is, it would cost more to try to repair these defects than the value that would be created in the property. The appraiser believes that it has a 60 year remaining economic life (75 year total economic life).

The building was constructed using a greater ceiling height than users require in the current market (super-adequacy). It would cost Sh.27 million to reproduce (reproduction cost) the building with the same ceiling height but Sh.25 million to construct a replacement property (replacement cost) with the same utility but a normal ceiling height.

The higher ceiling results in increased heating and air-conditioning cost of Sh.50,000 per year. A capitalisation rate that would be used to value the property would be 10%.

The building was designed to include a cafeteria that is no longer functional (functional obsolescence). This area can be converted to usable space at a conversion cost of Sh.25,000 and it is believed that the value of the property would increase by at least this amount (curable functional obsolescence).

The roof needs to be replaced at a cost of Sh.250,000 and other necessary repairs amount to Sh.50,000. The costs of these repairs will increase the value of the building by at least Sh.300,000 (curable physical depreciation).

The road providing access to the property is a single lane road, whereas newer industrial properties are accessible by two lane road. This has a negative impact on rents (locational obsolescence), which is estimated to reduce net operating income (NOI) by Sh.100,000 per year.

Based on comparable sales of vacant land, the land is estimated to be worth Sh.5 million.

Required:
Estimate the value of the property using the cost approach. (10 marks)
(Total: 20 marks)

QUESTION TWO

(a) Describe two forms of protection provided to noteholders in a collateralised debt obligations (CDOs). (4 marks)

(b) Explain two ways of creating transaction-based indexes in real estate. (4 marks)

(c) Examine four mechanisms that offer call protection to commercial mortgage backed securities (CMBS) investors at the loan level. (4 marks)

(d) Explain four factors affecting prepayment behavior of a mortgage backed security (MBS). (4 marks)

(e) The spot price today for a bushel of maize is Sh.2,250. The continuously compounded interest rate is 5.5% and the storage cost is 2.0% per month.

Required:
The 6-month forward price. (4 marks)

(Total: 20 marks)

QUESTION THREE

(a) Explain four categories of leveraged buyouts (LBOs) that create value to investors. (4 marks)

(b) Describe three biases in hedge fund indices. (3 marks)

(c) An investment firm has assembled Sh.80 million pool of 30 year fixed rate mortgages. The pool characteristics and its estimated cash flows are provided below. The pool has a weighted average coupon (WAC) of 6%, a weighted average maturity (WAM) of 356 months, and under current market conditions, prepayments are expected at 310 Public Securities Association (PSA) prepayment assumption.

The pool's cash flow estimates are as follows:

Months from now	Outstanding balance (Sh.)	Mortgage payment (Sh.)	Net interest (Sh.)	Scheduled principal (Sh.)
24	47,563,831	327,321	281,419	45,901

Required:

(i) Using the 310 PSA prepayment assumption, calculate the current prepayment rate of the pool. (3 marks)

(ii) Calculate the expected prepayment amount given a single monthly mortality (SMM) prepayment rate of 2.1482%. (3 marks)

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(d) The subject property for an analyst is a supermarket containing 22,000 square feet, with a land value of Sh.2 million derived from recent sales. The property is zoned commercial and is currently leased at market rent to a supermarket chain on a 10-year lease at Sh.80 per square foot per year. A vacancy and collection loss allowance of 5% is indicated to reflect the credit rating of the tenant and the term of the lease.

Allowable expenses consist of the following:

- Insurance Sh.380,000.
- Maintenance and repairs Sh.800,000.
- Management of property 5% of effective gross income.
- Legal fees 1% of effective gross income.

Additional information:

1. The land should return a yield of 8%.
2. The capitalisation rate for the building include 10% overall yield and 2% for recapture.

Required:
Using straight-line capitalisation method, estimate the value of the supermarket. (7 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Describe three theories of commodities future returns. (6 marks)

(b) Decribe three futures market participants citing their roles. (6 marks)

(c) Joshua Muteti recently took a fully collateralised long futures position on a nearby coffee futures contract at the quoted futures price of Sh.125. Three months later, the entire futures position was rolled when the near term futures price was Sh.127 and the further-term futures price was Sh.128. During the three-month period between the time that the initial long position was taken and the rolling of the contract, the collateral earned an annualised rate of 1%.

Required:
Determine Joshua's three-month total return on the coffee futures trade. (4 marks)

(d) An investment and financial analyst gathered the following data relating to three collateralised mortgage obligation (CMO) tranches:

Securities	Nominal spread (%)	Spread comparison zero volatility spread (%)	Option adjusted spread (%)
P	3.17	2.74	0.00
Q	4.35	1.96	-0.63
R	2.05	2.16	0.84

Required:
Determine the most appropriate security to invest in. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Explain the term "early amortisation" in the context of credit enhancement. (2 marks)

(b) Explain three benefits of crowdfunding to each of the following market participants:

(i) Investors. (3 marks)

(ii) Borrowers. (3 marks)

(c) A private equity has the following cash flows data:

Amount in shilling millions

Year	Capital called down	Operating results	Management fees	Net asset value before distributions	Carried interest	Distributions	Net Asset value after distributions
2016	200	-40	3.0	157.0	0	0	157.0
2017	100	-70	4.5	182.5	0	0	182.5
2018	100	100	6.0	376.5	0	70	306.5
2019	50	180	6.8	529.8	7.4	100	422.3
2020	50	250	7.5	714.8	46.3	150	518.5

Required:
Calculate the fund's multiples for the year 2020:

(i) Distributed to paid in capital (DPI). (2 marks)

(ii) Residual value to paid in capital (RVPI). (2 marks)

(iii) Total value to paid in capital (TVPI). (2 marks)

(d) Fred Okumu is considering investing in an interest only (IO) tranche of a collaterised mortgage obligation (CMO) with a coupon of 10% per annum.

The following information relates to the CMO:

Tranche	Par amount Sh. "000"	Coupon rate (%)
P	614,000	7.85
Q	540,000	8.05
R	476,000	8.75
S	523,000	9.65

Required:
The notional amount for this notional interest only (IO) tranche. (6 marks)

(Total: 20 marks)

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Present Value Interest factor of 1 Received at the End of *n* Periods at r Percent:

$$PVIF_{r,n} = 1 / (1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1078	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.8730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0073	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005		
38	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014			
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007			
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006				

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Present Value Interest factors for Annuity of 1 Discounted at r Percent for *n* Periods:

$$PVIFA_{r,n} = [1 - 1/(1+r)^n] / r$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9984	3.3330
38	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 20 May 2021. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Private investors use structured products to gain access to alternative investments.

In light of the above statement, cite four reasons for popularity of structured products in the recent past. (8 marks).

(b) Explain the meaning of the following terms as used in commodities market:

(i) Contract for differences (CFDs). (2 marks)

(ii) Calendar spread strategy. (2 marks)

(c) Stawi Fund is a hedge fund with a value of Sh.250 million at the beginning of 2018. The fund charges 2.5% management fees based on the asset under management (AUM) at the beginning of the year and a 25% incentive fee with a 7.5% hurdle rate and uses a high water mark (HWM) provision. Incentive fees are calculated on gains net of management fees.

The closing values for each year before fees are as follows:

Year	Amount Sh."000"
2018	285,450
2019	288,120
2020	307,670

Required:
The total fees and investor's net return for each of the three years. (8 marks)
(Total: 20 marks)

QUESTION TWO

(a) Highlight five disadvantages of investing in real estate as an alternative investment class. (5 marks)

(b) (i) Explain three incentives for hedge funds replication strategies in the context of hedge fund management. (6 marks)

(ii) A hedge fund utilises a strategy which generates profits on assets of 0.3% per month. The interest expense on its leverage is 0.2% per month. The fund seeks a return on equity (ROE) of 0.8%.

Required:
Determine the leverage that the fund must utilise to generate the desired return on equity (ROE). (3 marks)

(c) Webmill Group Limited manages a Sh.250 million private equity fund. Investors committed to a total of Sh.300 million over the term of the fund and a specified carried interest of 20% and a hurdle rate of 10%. Carried interest is distributed on a deal by deal basis. 60% of the Sh.250 million has been invested at the beginning of year 1 in Kimbo Ltd. with the remaining 40% invested in Tidco Ltd. Both firms are sold at the end of the third year, realising a Sh.45 million profit for Kimbo Ltd. and a Sh.35 million profit for Tidco Ltd.

Required:
The carried interest paid to the fund's general partner for Kimbo Ltd. and Tidco Ltd. (6 marks)
(Total: 20 marks)

QUESTION THREE

(a) An appraiser has been asked to estimate the value of a warehouse and has collected the following information:

1. Each adjustment is based on the unadjusted sales price of the comparable.
2. Properties depreciate at the rate of 2% per annum.
3. Condition adjustment; Good: + 5%, average: none, poor: –5%.
4. Location adjustment: Prime – none, secondary –10%.
5. Over the past 24 months, sales price has been appreciating at the rate of 0.5% per month.

		Comparable transactions		
Unit of comparison	**Subject property**	**1**	**2**	**3**
Size (in square feet)	30,000	40,000	20,000	35,000
Ages (in years)	5	9	4	5
Physical condition	Average	Good	Average	Poor
Location	Prime	Prime	Secondary	Prime
Sales date (months ago)		6	18	12
Sales price		Sh.9,000,000	Sh.4,500,000	Sh.8,000,000

Required:
Calculate the estimated value of the warehouse using the sales comparison method. (10 marks)

(b) Abby Mutugi recently completed a Monte Carlo simulation analysis of a collateralised mortgage obligation (CMO) tranche. Abby's analysis included six equally weighted paths, with the present value calculated using four different discounts rates, shown below:

Representative path	**Present value if spread is 50 basis points**	**Present value if spread is 60 basis points**	**Present value if spread is 70 basis points**
1	70	68	66
2	73	70	68
3	68	66	64
4	71	69	68
5	77	75	73
6	75	73	71

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The actual market price of the CMO tranche is 70.17.

Required:
The tranche's option adjusted spread (OAS). (4 marks)

(c) An investor currently holds the following structured products:

- A fairly new home equity-backed asset backed security (ABS).
- Automobile receivable-backed asset backed security (ABS).
- Planned amortisation class (PAC) collateralised mortgage obligation (CMO).
- Support bonds collateralised mortgage obligation (CMO).

He is concerned about the expected decline in interest rates:

Required:

(i) Giving two reasons in each case, identify the cash flow of the ABS that will be more affected by the decline in interest rates and the ABS that will be less affected by a decline in interest rates. (4 marks)

(ii) Explain the effects of decline in interest rates on the two types of collateralised mortgage obligations (CMOs). (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Discuss the lifecycle stages of a venture capital fund. (10 marks)

(b) Explain the meaning of the following terms as used in alternative investments:

(i) Rolling contracts. (1 mark)

(ii) Marking to market. (1 mark)

(iii) High water mark (HWM). (1 mark)

(iv) Prepayment tranching. (1 mark)

(v) Credit tranching. (1 mark)

(c) The following information relates to commodities futures contract traded at the derivatives exchange market:

Contract maturity	Futures prices as at April 2021 Sh.	Futures prices as at March 2021 Sh.	Changes in spot price Sh.
May 2021	1,445	1395	17.5
June 2021	1,425	1382.50	17.5
July 2021	1,394	1350.50	17.5

Required:

(i) The roll return. (3 marks)

(ii) Identify the term structure of the futures prices illustrated above. (1 mark)

(iii) Demonstrate a futures strategy that will provide a positive return in (c) (ii) above. (1 mark)

(Total: 20 marks)

QUESTION FIVE

(a) Francis Thuo has been appointed as a private equity manager at KKQ Limited a private equity firm and is interested in identifying a potential leveraged buyout firm to acquire.

Required:

Advise Francis Thuo on five characteristics of a well suited leveraged buyout (LBO) candidate. (5 marks)

(b) Outside service providers provide professional services that are vital to the formation and continued operation of alternative investment funds.

In light of the above statement, identify four legal documents prepared by advocates in relation to hedge funds. (4 marks)

(c) An investment analyst has gathered the following data on three different real estate investment trusts (REITs):

Select REIT financial information (All figures in shillings):

	REIT A	REIT B	REIT C
Property subsector	**Office**	**Storage**	**Healthcare**
Estimated 12 months' cash net			
Net operating income (NOI)	350,000	267,000	425,000
Funds from operations (FFO)	316,965	290,612	368,007
Cash and cash equivalent	308,700	230,850	341,000
Accounts receivable	205,800	282,150	279,000
Debt and other liabilities	2,014,000	2,013,500	2,010,000
Non-cash rents	25,991	24,702	29,808
Recurring maintenance type			
Capital expenditure	63,769	60,852	80,961
Shares outstanding	56,100	67,900	72,300

REIT divided forecasts and average price multiples:

	REIT A	REIT B	REIT C
Expected annual dividend next year	Sh.3.80	Sh.2.25	Sh.4.00
Dividend growth rate in years 2 and 3	4.0%	5.0%	4.5%
Dividend growth rate after year 3 into perpetuity	3.5%	4.5%	4.0%
Assumed cap rate	7.0%	6.25%	6.5%
Property subsector average P/FFO multiple	14.4X	13.5X	15.1X
Property subsector average P/AFFO multiple	18.3X	17.1X	18.9X

The cost of equity capital for all REITs is 8% and the risk free rate is 4.0%.

The analyst wants to value each REIT using four different methodologies:

Method 1: Net asset value (NAV).
Method 2: Discounted cash flow valuation using a two step dividend model.
Method 3: Relative valuation using property subsector price to funds from operations (P/FFO) multiple.
Method 4: Relative valuation using property subsector average price to funds from operations (P/AFFO) multiple.

Required:
Determine the value per share of the following:

(i) REIT A using valuation method 1. (3 marks)

(ii) REIT B using valuation method 3. (2 marks)

(iii) REIT C using valuation method 2. (3 marks)

(iv) REIT A using valuation method 4. (3 marks)
(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 23 May 2019. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Explain four buy side participants in the alternative investments environment. (4 marks)

(b) Examine four characteristics of mezzanine debt. (4 marks)

(c) The following financial data was extracted from the books of Umoja Shopping Mall for the year ended 31 December 2018:

	-Sh."000"
Net Operating Income (NOI) .	80,000
Cash and cash equivalents	20,000
Accounts receivable	15,000
Total debt	250,000
Sundry creditors	50,000
Non-cash rent	2,000
Full-year acquisition adjustments	1,000
Land held for future development	10,000
Prepayments	5,000

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Additional information:

1. Growth of NOI for the year 2019 is projected to be 1.25%.
2. Capitalisation rate based on recent comparable transaction is 8.0%.
3. Number of ordinary shares outstanding is 15,000,000.

Required:

The net asset value per share (NAVPS) for the Umoja Shopping Mall. (7 marks)

(d) Valley Ltd. is an agri-business company. The founders believe they can sell the company for Sh.40 million in 5 years time. The founders require Sh.5 million in capital now and they currently hold 1 million ordinary shares. The venture capital decides that given the high risk of this company, the discount rate of 40% is appropriate.

Required:

(i) The pre-money valuation for the venture capital. (1 mark)

(ii) The post-money valuation for the venture capital. (1 mark)

(iii) The ownership fraction. (1 mark)

(iv) The price per share using the net present value (NPV) method with a single financing round. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Highlight three benefits of farmland as an alternative asset. (3 marks)

(b) Assume a piece of farmland costs Sh.110,000 per acre and an investor purchases 10 acres of the land. The investor finances 75% through bank loan and puts 25% equity in the deal. The interest rate for the loan is 5%.

Additional information:

1. The investor leases the farm to a local farmer for Sh.12,000 per acre per year earning a return of Sh.120,000 per annum.
2. Property taxes amount to Sh.30,000 per annum.
3. Insurance amounts to Sh.10,000 per year.

Required:

(i) Return on equity (ROE) on the farmland. (3 marks)

(ii) Operating return on asset (ROA) on the farmland. (3 marks)

(c) A property was let for a five year term, three years ago at Sh.400,000 per year. Rent review occurs every five years. The estimated rental value in the current market is Sh.450,000 and the risks yield on comparable fully let properties is 5%. The incremental rent is to be discounted at a rate of 6%.

Required:

Estimate the value of the property using the layer method. (4 marks)

(d) The following information relates to a Leveraged Buyout (LBO) transaction valued at Sh.800 million:

Additional information:

1. Exit occurs in seven years at a projected multiple of 1.8 of the company's original cost.
2. The LBO is financed through a debt to equity ratio of 65% and 35% respectively.
3. The Sh.280 million equity is composed of:
   - Sh.200 million in preference shares held by the private equity firm.
   - Sh.75 million in equity held by the private equity firm.
   - Sh.5 million in equity held by management equity participation.
4. Preference shares are guaranteed at 14% compound annual return payable at exit.
5. The equity of the private equity (P/E) firm is promised 90% of the firm's residual value at exit after the creditor's and preference shares are paid.
6. Management equity participation receives 10% balance.
7. By exit, the company will have paid Sh.300 million of the initial Sh.520 million in debt using operating cash flows.

Required:

The payoff multiple for the equity claimants (private equity). (7 marks)

(Total: 20 marks)

QUESTION THREE

(a) Discuss two exit strategies available for private equity investors. (4 marks)

(b) (i) Describe three types of risks that could be faced by hedge fund managers. (3 marks)

(ii) Tom Ltd., a fund of hedge funds, has the following fee structure:

- 2/20 underlying fund fees with incentive fees calculated independently.
- Tom Ltd. fees are calculated net of all underlying fund fees.
- 1% management fee (based on year end market value).
- 10% incentive fee calculated net of management fee.
- The fund and all underlying funds have no hurdle rate or high-water mark (HWM) fee conditions.

In the latest year, Tom Ltd.'s funds value increased from Sh.100 million to Sh.133 million before deduction of management and incentive fees of the fund or underlying funds.

Required:

The total fee earned by all the funds in the aggregate. (7 marks)

(c) Rachel Wamae owns a newly issued government agency fixed rate pass through mortgage backed security (MBS) and wants to evaluate the sensitivity of its principal cash flow to the following interest rate scenario:

Interest rates instantaneously decline by 250 basis points for all maturities, remain there for one year, and then,

Interest rates instantaneously increase 350 basis points for all maturities and remain there for the next year.

Currently, the MBS is priced close to par and the yield curve is flat. Rachel does not expect the shape of the yield curve to change during the interest rate scenario.

Rachel also wants to evaluate the price sensitivity of her MBS to changes in interest rates. She knows that modified duration and effective duration are two possible measures she could use to evaluate price sensitivity.

Rachel also owns a newly issued government agency collateralised mortgage obligation interest only (IO) security.

Required:

(i) Discuss the reasons why the MBS principal cash flows change. (2 marks)

(ii) Justify with reasons the duration measure that Rachel Wamae should use to evaluate the price sensitivity of her MBS. (2 marks)

(iii) Explain whether the interest only, IO, security price increases or decreases in the first year of the interest rate scenario described above. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Summarise four characteristics that differentiate the commodity indices from other alternative investment indices. (4 marks)

(b) A fund manager takes a fully collateralised long futures position in nearby coffee futures contract at the quoted futures price of Sh.865.0. Three months later, the entire futures position is rolled when the near term futures price is Sh.877.0 and the further term futures price is Sh.883.0. During the three month period between the time that the initial long position was taken and the rolling of the contact, the collateral earned an annualised rate of 0.60%.

Required:

The three month's total return on the coffee futures trade. (5 marks)

(c) Bomboo Ltd. is an all-equity financed firm. After a recent re-organisation, the company is considering issuing a debt in form of a collateralised mortgage obligation (CMO). The issuer is considering the two CMO structures as highlighted below:

Structure 1

Tranche	Par amount Sh. "million"	Coupon rate (%)
A	150	6.50
B	100	6.75
C	200	7.25
D	150	7.75
E	100	8.00
F	500	8.50

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Structure 2

Tranche	Par amount Sh. "million"	Coupon rate (%)
A	150	6.50
B	100	6.75
C	200	7.25
D	150	7.75
E	100	8.00
F	200	8.25
G	300	?

Tranches A to E are a sequence of planned amortisation class (PAC), tranche F is a PAC 2 and tranche E is a support tranche without a schedule.

In Structure 2, tranche G is created from tranche F in Structure 1.

Required:

(i) Determine the coupon rate for tranche G assuming that the combined coupon rate for tranches F and G in Structure 2, is 8.5%. (4 marks)

(ii) Explain the effect on the value and average life of tranches A-E including the PAC 2 in Structure 2. (2 marks)

(iii) Explain whether there is any difference in the average life variability of tranche G in Structure 2 and tranche F in structure 1. (2 marks)

(d) An investments analyst is considering the following asset backed sécurity (ABS) structure:

Tranche	Amount Sh."million"
Senior tranche	170
Subordinate tranche A	50
Subordinate tranche B	20
	240

The amount in the pool are worth Sh.280 million.

Required:

(i) Amount of overcollateralisation. (1 mark)

(ii) Amount of losses that the senior tranche investors begin to lose money. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Discuss four types of mortgage designs in the context of mortgage backed securities (MBS). (4 marks)

(b) A tranche of a mortgage backed security (MBS) has been split to create a floater with a principal of Sh.64,583,333 and an inverse floater of Sh.12,916,667.

The tranche has a coupon rate of 8.5%

Required:

(i) The capitalisation rate for the inverse floater when the coupon rate for the floater is 91-day treasury bill plus 1%. (4 marks)

(ii) The capitalisation rate for the floater when the coupon rate is 91-day treasury bill plus 1% and a floor is imposed on the inverse floater of zero. (2 marks)

(c) Describe four loan level call protection mechanism that cushions an investor of a commercial mortgage backed security (CMBS) from exposure to loan prepayment risks. (4 marks)

(d) Fredrick Onyango owns a mortgage pass through in which the remaining mortgage balance at the beginning of the month is Sh.290 million and the Conditional Prepayment Rate (CPR) is 6%. The scheduled principal payment is Sh.3 million.

Required:

(i) The single-monthly mortality rate (SMM). (2 marks)

(ii) The estimated prepayments. (2 marks)

(iii) The SMM for month 5 assuming a benchmark of 100. (2 marks)

(Total: 20 marks)

Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	.	.
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001	.	.	.	.
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001	.	.	.	.	.	.

* The factor is zero to four decimal places

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Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

KASNEB

CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 26 November 2015. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Highlight six types of risks associated with infrastructure as a form of alternative investment. (6 marks)

(b) Describe three investment characteristics of stripped mortgage-backed securities. (3 marks)

(c) The ultimate goal for private equity investment is to improve new or under-performing businesses and exit them at high valuations. However, the time to exit can range from less than six months to over 10 years.

Required:
In relation to the above statement, examine three exit strategies pursued by private equity portfolio managers. (3 marks)

(d) Kipkorir Kipyegon is an alternative investment manager for Stanbib Asset Managers (SAM) which deals with commodities trading. He is currently investigating trading opportunities in the copper market. The spot price is Sh.316 and the three-month forward contract price is Sh.313. He is contemplating implementing a reverse cash and carry arbitrage to profit from the difference between the spot and forward prices.

Currently, Kipyegon can borrow or lend cash at the rate of 5% and the lease rate for copper is 6%. The borrowing, lending and lease rates are all continuously compounded interest rates.

Required:

(i) Describe the two components of the synthetic commodity position in this arbitrage. (2 marks)

(ii) Compute Kipyegon's profit on a reverse cash and carry arbitrage in the copper market. (6 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain the following economic terms as used in private equity fund structures:

(i) Carried interest. (1 mark)

(ii) Ratchet. (1 mark)

(iii) Hurdle rate. (1 mark)

(iv) Management fees. (1 mark)

(v) Vintage year. (1 mark)

(b) Assess five ways which drives expansion of real estate investment trusts (REITs). (5 marks)

(c) An investor purchases a 30-year, Sh.500,000 level payment fully amortised mortgage with a fixed rate of 12%.

Required:
The outstanding principal at the end of three months. (3 marks)

(d) The original founder members of Madonge Ltd. are extremely optimistic and believe that the firm could be sold for Sh.400 million in six years. To achieve this target, they speculate that the firm will require another capital infusion of Sh.40 million in four years time in addition to the Sh.20 million capital investment today.

Given the high risk of the firm, Madonge Ltd.'s private equity investors decide that a discount rate of 40% for the first four years and 30% for the last two years would be appropriate. The founders of Madonge Ltd. intend to hold five million shares.

Required:

(i) The firm's post money valuation at the first round of financing using the net present value (NPV) venture capital method. (4 marks)

(ii) The appropriate share price after the first round of financing for Madonge Ltd.'s first round investors. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Kiraita Kindika is the chief investment officer of a pension fund which allocates a substantial portion of its assets to private equity. The existing private equity portfolio is made up of large buyout funds, mezzanine funds and a limited allocation to a special situations fund. The pension fund decided to further increase its allocation to a venture capital.

Required:

In relation to the above statement, summarise four differences between venture capital and buyout investing. (4 marks)

(b) (i) Summarise four classifications of hedge funds. (4 marks)

(ii) Explain three regulatory concerns associated with hedge funds. (3 marks)

(c) An investment analyst gathered the following data relating to three collateralised mortgage obligation (CMO) tranches:

		Spread comparison	
	Nominal spread (%)	**Zero volatility spread (%)**	**Option adjusted spread (%)**
Security X	2.12	1.67	0.00
Security Y	3.18	1.30	-0.27
Security Z	1.84	1.46	0.67

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Required:

Determine the most appropriate security for the investment analyst to invest in. (3 marks)

(d) A collateralised debt obligation (CDO) is a Sh.200 million structure. The collateral is expected to have an initial value of Sh.200 million. The collateral also consists entirely of bonds with 15 years to maturity and a coupon rate equal to 15-year treasury bond rate plus 350 basis points.

The senior tranche represents 75% of the structure and carries a floating coupon rate equal to LIBOR plus 150 basis points. There is only one Sh.20 million mezzanine tranche which carries a fixed coupon equal to the treasury rate at origination plus 175 basis points. The manager of the Trust has entered into an interest rate swap under which the Trust will pay an annual fixed rate equal to the treasury rate plus 125 basis points and receive LIBOR. The notional amount for this swap is Sh.150 million. The 15-year treasury rate is 7.5% at the time of origination for this CDO.

Required:

Calculate the cash flow available to pay the tranche. (6 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Evaluate four ways in which investors could participate in commodity markets. (4 marks)

(b) Discuss four challenges that could be encountered by investment professionals when analysing private equity investments. (4 marks)

(c) A critical investment feature that distinguishes commercial mortgage-backed securities (CMBS) from residential mortgage-backed securities (RMBS) is the protection against early prepayments available to investors called "call protection". An investor in RMBS is exposed to considerable prepayment risk since the borrower has the right to repay a loan, in whole or in part, before the scheduled principal repayment date.

Required:

With reference to the above statement, explain four mechanisms that offer investors call protection at the loan level. (4 marks)

(d) The general partner for a private equity fund charges a management fee of 2% and carried interest of 20% using the total return method. The total committed capital for the fund is Sh.150 million.

The following data relates to the above equity fund:

Year	Cash flows		
	Capital called down Sh. "million"	Operating results Sh. "million"	Distributions Sh. "million"
2010	50	-10	-
2011	20	-25	-
2012	30	25	-
2013	20	50	20
2014	10	60	40
2015	10	110	80

Required:
Residual value to paid in (RVPI). (8 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Evaluate three key benefits of using price-to-funds from operations (P/FFO) and price-to-adjusted funds from operations (P/AFFO) multiples in the valuation of real estate investment trusts (REITs) and real estate operating companies (REOCs). (3 marks)

(b) Discuss three sources of return for a commodity futures position. (3 marks)

(c) Distinguish between the following terms:

(i) "Contango" and "backwardation". (2 marks)

(ii) "Market-defensive funds of funds" and "strategic funds of funds". (2 marks)

(d) Brian Nyanam has recently completed a monte carlo simulation analysis of a collateralised mortgage obligation (CMO) tranche. His analysis includes six equally weighted paths, with the present value of each calculated using four different discount rates.

The table below illustrates this information:

Representative path	Present values: At 50 basis points spread	At 60 basis points spread	At 70 basis points spread
1	70	68	68
2	73	70	68
3	68	66	64
4	71	69	68
5	77	75	73
6	75	73	71

The actual market price of the CMO tranche being valued is 70.17.

Required:
Determine the tranche's option adjusted spread (OAS). (3 marks)

(e) (i) Define the term "rolling return of a hedge fund". (1 mark)

(ii) The following information relates to a hedge fund's returns and the respective index returns for twelve months:

Month	Hedge fund returns (%)	Index returns (%)
January	3.50	-2.40
February	4.00	-4.00
March	-2.00	-1.60
April	-2.00	3.00
May	-1.00	-4.20
June	0.90	2.00
July	-1.00	2.50
August	1.70	-2.10
September	2.70	-2.00
October	3.70	0.50
November	0.40	3.10
December	-3.20	0.20

Required:
The average rolling return for the hedge fund if the investor's investment horizon is nine months. (6 marks)

(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,t} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 2 September 2021. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Explain four characteristics of alternative investments that differentiate them from traditional investments. (4 marks)

(b) Evaluate four types of taxation that could be levied on alternative investments products. (4 marks)

(c) Differentiate between the following types of stripped mortgage backed securities (MBS):

(i) Principal only (PO) strips. (2 marks)

(ii) Interest only (IO) strips. (2 marks)

(d) An analyst has gathered the following data to value a real estate investment trust (REIT):

REIT valuation projections and assumptions

Appropriate discount rate	8.5%
Expected dividend per share (DPS), 1 year from today	Sh.1.00
Expected dividend per share (DPS), 2 years from today	Sh.1.06
Long term growth rate in dividends, starting in year 3	5.0%

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Required:

The intrinsic value of the REIT on a per share basis using the two step dividend discount model. (4 marks)

(e) Bermuda Life Insurance Company (BLIC) is an active lender on commercial real estate property and has provided you with the following information relating to property A:

1. The loan term is 5 years.
2. Interest rate of 5.75% interest only.
3. Maximum loan to value (LTV) of 75% and minimum debt service coverage ratio of 1.5 times.
4. The net operating income is as provided below:

Year	**1**	**2**	**3**
Net operating income (Sh.)	2,775,840	2,859,119	2,994,889

5. The appraised value of the property is Sh.48 million.

Required:

The maximum loan amount on the property. (4 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain two uses of Monte Carlo Simulation Model in valuation of mortgage backed securities (MBS). (4 marks)

(b) Alfred Ngugi is evaluating an agency collateralised mortgage obligation (CMO) structure using the Monte Carlo Simulation Model based on a 10% volatility assumption:

Tranche	**Z-spread**	**Option adjusted spread (OAS)**
A	200	170
B	185	150
C	250	140

Required:

(i) Determine the option cost (in basis point) for each tranche. (2 marks)

(ii) Determine which tranche appears to be most attractive. (2 marks)

(c) Examine four advantages of investing in a real estate operating company (REOC). (4 marks)

(d) Fahari Real Estate Investment and Business Advisors does valuation on behalf of clients buying and selling real estate. The firm has been provided with the following data regarding Boma apartment complex as well as recent sales in the area:

Boma apartment complex	**Sh."000"**
Gross potential rental income	300,000
Estimated vacancy and collection losses	6%
Insurance	17,500
Taxes	7,500
Utilities	17,500
Repair and maintenance	30,000
Depreciation	35,000
Interest on proposed financing	27,500

Additional information on buildings recently sold:

	Office buildings Sh."000"	**Apartments Sh."000"**
Net operating income	750,000	150,000
Sales price	5,000,000	1,250,000

All incomes are on annual basis.

Required:

(i) Determine the value of Boma apartment complex. (5 marks)

(ii) Describe three challenges of using comparable companies to value private targets. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Discuss three reasons for creating collateralised debt obligations (CDOs). (6 marks)

(b) In relation to commodities investment:

(i) Differentiate between "basis" and "calendar spread". (2 marks)

(ii) Outline three roles of commodity indexes. (3 marks)

(iii) The November price of an agricultural commodity is Sh.2.50 per kilogram, the effective interest rate is 1% and the storage cost per kilogram are Sh.0.05 per month. The commodity is stored from November to February.

Required:

Compute the February arbitrage free price. (3 marks)

(c) Fund A with an initial investment of Sh.20 million liquidates with Sh.24 million cash after one year. The hurdle rate is 15% and the incentive fee is 20%.

Required:

Determine the distribution to fund manager assuming:

(i) The fund uses a hard hurdle. (3 marks)

(ii) The fund has a soft hurdle and a 50% catch up rate. (3 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Summarise five unique risks of investing in hedge funds. (5 marks)

(b) Christopher Wamalwa, an investor in real estate in Kwetu County is considering taking a residential mortgage facility offered by Nyumba Housing Finance to construct a rental apartment.

Additional information:

1. The mortgage company advanced him Sh.6 million repayable within 30 years.
2. The interest rate is 12% per annum payable on a monthly basis.
3. Payment consist of both interest and principal.

Required:

(i) Construct a constant payment mortgage (CPM) schedule for the first six months. (7 marks)

(ii) Describe one advantage and one disadvantage of using constant mortgage amortisation (CMA) approach in analysing mortgage payments. (2 marks)

(c) Alex Mutiso owns a mall using mortgage financing, spread over ten years period.

Additional information:

1. The beginning mortgage balance in month 33 is Sh.297,825.
2. Prepayment in month 33 is Sh.1,841,347.
3. Outstanding loan amount is Sh.358,326,766.

Required:

(i) Single monthly mortality rate (SMM). (2 marks)

(ii) Conditional prepayment rate (CPR). (2 marks)

(iii) Interpret your answers in (c) (i) and (c) (ii) above. (2 marks)

(Total: 20 marks)

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QUESTION FIVE

(a) Explain the following terms in the context of private equity:

(i) Carried interest. (1 mark)

(ii) Claw-back provision. (1 mark)

(iii) Vintage year. (1 mark)

(iv) J – curve effect. (1 mark)

(b) Suggest two reasons why leveraged buyout funds (LBO) are less risky compared to venture capital funds. (4 marks)

(c) Hekima fund has a 2 and 20 fee arrangement with no hurdle rate and a net asset value (NAV) of Sh.500 million. The NAV increased to Sh.625 million at the end of year before fees. Management fees are distributed annually based on the start of the year NAV.

Required:

(i) Annual management fee. (1 mark)

(ii) Incentive fee. (1 mark)

(iii) Total annual fee. (1 mark)

(iv) Ending NAV after fees. (1 mark)

(v) Percentage return net of fees. (1 mark)

(d) You have recently landed a job as the Chief Investment Officer (CIO) at Delta Limited. One of your client is considering investing in real estate and you are now evaluating three potential real estate investment options as follows:

I	**Direct investment in a hotel building:**	
	Expected net operating income (years 1 – 7)	Sh.7 million
	Expected net operating income (year 8)	Sh.8.5 million
	Required return on equity investment	12%
	Net operating income growth rate after 8 years	3.5%
II	**Real estate investment trust (REIT)**	
	Recent net operating income	Sh.140 million
	Non cash rents	Sh.10 million
	Full year adjustments for acquisition	Sh.10 million
	Other assets	Sh.40 million
	Total liabilities	Sh.250 million
	Current market price per share (MPS)	Sh.130
	Outstanding ordinary shares	12 million
	Going in capitalisation rate	8%
	Net operating income growth rate	2.4%
III	**Real estate operating company (REOC)**	
	Expected adjusted funds from operation (AFFO) in year 8	Sh.14.5 million
	Holding period	7 years
	Present value of all dividends for 7 years	Sh.42 million
	Outstanding ordinary shares	2 million
	Capitalisation rate	8%
	Growth rate from year 8	2.4%

Additional information:

1. The hotel building under consideration has existing tenant with long-term lease that will expire in seven years.
2. The real estate operating company (REOC) terminal value at the end of the seven years is to be based on a price to adjusted funds from operations (AFFO) multiple of 12 times (12x).

Required:

(i) The estimated value of the hotel building using the discounted cash flow approach. (3 marks)

(ii) Determine whether the real estate investment trust (REIT) is fairly priced using the net asset value (NAV) approach. (3 marks)

(iii) The estimated value per share of the real estate operating company (REOC). (1 mark)

(Total: 20 marks)

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Present Value Interest factor of 1 Received at the End of *n* Periods at r Percent:

$PVIF_{r,n} = 1 / (1+r)^n = (1+r)^{-n}$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3226	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	-
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	-	-
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	-	-	-
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	-	-	-
50	0.6086	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	-	-	-	-

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Present Value Interest factors for Annuity of 1 Discounted at r Percent for *n* Periods:

$PVIFA_{r,n} = [1 - 1/(1+r)^n] / r$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9984	3.3330
36	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333

kasneb

CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

FRIDAY: 27 November 2020. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Securitisation may be the wave for the future as it appears to be a more efficient mechanism for bringing borrowers and investors together than traditional financing through intermediaries. This was the closing remark by a presenter in a securitisation seminar.

Required:
In relation to the above statement:

(i) Explain the term "securitisation". (2 marks)

(ii) Discuss three benefits that may accrue to a company that uses securitisation in its operations. (3 marks)

(b) Nancy Chepkonga recently retired from employment and received a lumpsum pension benefit. The company had earlier arranged for a retirement planning seminar where one of the presenter noted that one can generate superior returns in their portfolio by incorporating alternative investments. Nancy is naive about these new products and has approached you for professional advice.

Required:
In light of the above statement, advise Nancy on two pros and two cons of alternative investments for retirees. (4 marks)

(c) Evaluate three outside service providers involved during creation and operationalisation of alternative investments in your country. (6 marks)

(d) An investment analyst working with Lion Capital has gathered the following data relating to four collateralised mortgage obligation (CMO) tranche:

Security	Nominal Spread (%)	Spread comparison Zero volatility spread (%)	Option adjustment Spread (%)
1	2.49	1.96	–0.01
2	3.74	1.53	0.37
3	2.16	1.72	0.71
4	1.83	1.39	–0.33

Required:
Advise on the most appropriate security for the investment analyst to invest in. (5 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain the meaning of the following terms as used in private equity:

(i) An angel investor. (1 mark)

(ii) An incubator. (1 mark)

(iii) Mezzanine capital. (1 mark)

(iv) Acceleration. (1 mark)

(b) The following are the details of Gemini Fund with a vintage year of 2017 and a committed capital of Sh.1.95 billion:

Venture capital for Gemini Fund

Year	Called-Down Sh."million"	Management fee Sh."million"	Operating results Sh."million"
2017	300	4.5	(100)
2018	250	8.3	550
2019	750	19.5	750

Additional information:

1. The distribution waterfalls calls for a 20% carried interest when Net Asset Value (NAV) before distribution exceeds committed capital.

2. The Gemini Fund is considering a new investment in Orion Company Limited. Orion Limited is a start-up Biotechnology Company seeking Sh.90million in venture capital financing. Orion's founders believe that, based on the company's new drug pipeline, a company value of Sh.3 billion is reasonable in five years.

3. The management at Gemini Fund views Orion Limited as a risky investment (15% risk of failure) and is using a discount rate of 40%.

Required:

(i) Percentage management fee for Gemini Fund for the year 2019. (2 marks)

(ii) The amount of carried interest for Gemini Fund for the year 2019. (4 marks)

(iii) The Orion Limited's post money valuation using single period Net Present Value (NPV) method. (2 marks)

(iv) Assuming that Orion founders will hold 2.5 million ordinary shares of Orion Limited and that the post valuation is Sh.900 million, determine the price per share for the venture capital. (3 marks)

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(c) Amita Adeyo is a real estate analyst and has gathered the following data relating to a real estate proposal:

1. The market value of the land using comparables is Sh.12,500,000.
2. The total area is 2.5 million square feet.
3. The replacement cost and developer's profit is Sh.6.30 per square foot.
4. Curable deterioration is Sh.100,000.
5. The total economic life is 75 years and effective age is 15 years.
6. All estimated obsolescence costs are Sh.500,000.

Required:

Determine the estimated value of the real estate proposal using the cost approach. (5 marks)

(Total: 20 marks)

QUESTION THREE

(a) Describe five key attributes of both timberland and farmland as types of alternative investments. (5 marks)

(b) Assess five control mechanisms used by hedge funds to align interest of the managers of portfolio companies with the hedge fund's interest. (5 marks)

(c) A global hedge fund has a value of Sh.100 million at the beginning of the year. The fund charges a 2% management fee based on assets under management (AUM) at the end of the year and a 20% incentive fee with a soft hurdle rate of London Interbank Offered Rate (LIBOR) plus 2.5%. Incentive fees are calculated net of management fees. The relevant LIBOR rate is 2.5% and the fund's value at the end of the year before fees is Sh.120 million.

Required:

The net return to investors. (3 marks)

(d) Joram Muhia believes he has identified an arbitrage opportunity for a commodity as indicated by the information below:

Commodity price and interest rate information:

Spot price for commodity	Sh.120
Futures price for commodity expiring in 1 year	Sh.125
Interest rate for one year	8%

Required:

(i) Describe the transactions necessary to take advantage of this specific arbitrage opportunity. (2 marks)

(ii) Calculate the arbitrage profit. (2 marks)

(iii) Propose three market imperfections that could limit Joram's ability to implement this arbitrage strategy. (3 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Explain two advantages and two disadvantages of issuing mezzanine debt. (4 marks)

(b) A collateralised debt obligation (CDO) structure has Sh.100 million in issue which is the collateral:

Tranche	Par value (Sh."million")	Coupon rate
Senior	80	LIBOR + 70 basis point
Mezzanine	10	10 year Treasury bond rate + 200 basis point
Equity	10	–

The collateral consist of all bonds that mature in 10 years and that the coupon rate for every bond is the 10 year Treasury bond rate plus 400 basis point.

The manager of the trust has entered into an interest rate swap under which the trust will pay a fixed rate each year equal to the 10 year Treasury rate plus 100 basis point and receive LIBOR. The notional amount of the interest rate swap is the par value of the senior tranche.

The 10 year Treasury bond rate at the time this CDO is issued is 7%. The CDO's management fee is Sh.500,000.

Required:

(i) The arbitrage profit from this collateralised debt obligation (CDO) transaction. (8 marks)

(ii) Describe two motivations of creating a collateralised debt obligation in (b) (i) above. (2 marks)

(c) Faida Consultants is reviewing various mortgage backed securities (MBS) for its clients. The consultants are interested in calculation of a single monthly mortality (SMM) rate. The consultants use the Public Securities Association (PSA) standard prepayment benchmark. They also calculate the sum for month 22, assuming a 140 PSA to be 0.37%. They also calculate the SMM for month 200, assuming a 90 PSA to be 0.46%.

Required:

Justify the validity of their estimates for months 22 and 200. (6 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Evaluate three factors that could affect prepayment behavior for mortgage backed securities (MBS). (6 marks)

(b) Nyumba Investment Company is a member-owned property investment firm whose main objective is to invest in domestic homes. The company has partnered with a local bank for financing of its two projects.

The following housing units are complete and available for sale:

Bungalows units	Sh.
BY-A	3,980,000
BY-B	8,540,000
BY-C	9,750,000

Additional information:

1. The gross project value is Sh.1.565 billion.
2. The loan finance available is Sh.867 million
3. The units will be paid at 133% of the rate at which revenue will be received.

Required:

The release price for each house unit. (4 marks)

(c) Ayub Kimeu is analysing two specific apartments. Blue Oaks apartment and Green Ridge apartment. Both apartments are next to each other and were built 10 years ago by the same construction company. The apartments have the same number of units and amenities. The apartments are also managed by the same property management company.

The following information relates to the two apartments:

	Blue Oaks Apartment	**Green Ridge Apartment**
Annual net operating income end of year 1	Sh.2,187,500	Sh.2,125,000
Loan to value (LTV) ratio	75.0%	70.0%
Loan interest rate	4.00%	3.50%
Monthly debt service	Sh.113,621	Sh.101,493
Loan term	20 years	20 years
Expected sale price in 10 years	Sh.30 million	Sh.30 million
Principal owed at the end of 10 years	Sh.11,222,397	Sh.11,144,755
Asking price	Sh.25 million	Sh.25 million

A pension fund can buy one or both apartments provided they meet the minimum criteria of a debt service coverage ratio of at least 1.50 times and a levered internal rate of return (IRR) of at least 17.5%.

Required:

Determine whether one or both apartments meet the minimum criteria for investment. (10 marks)

(Total: 20 marks)

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Present Value Interest factor of 1 Received at the End of *n* Periods at r Percent:

$PVIF_{r,n} = 1 / (1+r)^n = (1+r)^{-n}$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	*
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	*	*	*
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	*	*	*	*

Present Value Interest factors for Annuity of 1 Discounted at r Percent for *n* Periods:

$PVIFA_{r,n} = [1 - 1/(1+r)^n] / r$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9984	3.3330
36	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

WEDNESDAY: 27 November 2019. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Examine four forms of regulations imposed by the market regulator in your country to ensure that systematic risks associated with alternative investments are minimised. (4 marks)

(b) Highlight four objectives of including real estate to an investment portfolio as an alternative asset class. (4 marks)

(c) Utopia Investment Bank recently hired you to be its portfolio assistant manager. One of your key client whose account you are managing has shown interest in diversifying his portfolio through investment in a commercial building real estate investment trust (CREIT). The following information regarding the CREIT you have recommended is as follows:

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	Sh."000"
Estimated 12 months net operating income (NOI)	76,000
Funds from operation for the year ended 31 December 2018	66,500
Cash and cash equivalents	61,750
Accounts receivable	33,250
Non-cash rents	4,750
Debt and other liabilities	380,000
Recurring maintenance costs	14,250
Expected annual dividend to be paid in the year 2019	4,750

Additional information

1. The number of outstanding ordinary shares amounted to 9.5 million.
2. The dividend growth rate in the year 2020 and 2021 is expected to be 2% per annum and thereafter grow at 1% per annum from 2022 into perpetuity.
3. The assumed capitalisation rate is 7.5%.
4. The commercial building subsector average price-to-funds from operation (P/FFO) is 10 times while that of price-to-average funds from operation (P/AFFO) is 14 times.

Assume your cost of equity is 9% while the risk-free rate is 2%.

Required:

The value of CREIT using the following approaches:

(i) The net asset value (NAV). (3 marks)

(ii) The price-to-funds from operation (P/FFO). (3 marks)

(iii) The price-to-average funds from operation (P/AFFO). (3 marks)

(iv) Through discounted cash flow (DCF) method. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) (i) Propose two distribution waterfall methods that could be applied to facilitate the flow of accrued interest from a general partner to a limited partner in relation to private equity. (4 marks)

(ii) Zimera Fund is a private equity firm with interests in agricultural and building constructions. The firm has recently raised Sh.100 million capital with carried interest rate of 20%. Out of this fund, an investment to the tune of Sh.40 million is made and later in the year the firm will exit the investment and earn a profit of Sh.22 million.

Required:
Determine whether the general partner receives any carried interest under the waterfall distribution method. (4 marks)

(b) Describe four factors that could have contributed to the growth of the global distressed debt market in the recent past. (4 marks)

(c) Two financial analysts were tasked to analyse a potential investment in a leveraged buyout (LBO) of Rich Capital Limited. They seek to assess the expected gain if they elect to purchase all the preference shares and 90% of the ordinary shares in the LBO.
Details of the LBO include the following:

- The buyout requires an initial investment of Sh.10 million.
- Financing of the deal includes Sh.6 million in debt, Sh.3.6 million in preference shares that promises a 15% annual return paid at exit and Sh.0.4 million in ordinary shares. The expected exit value in six years is Sh.15 million with an estimated reduction in debt of Sh.2.8 million over the six years prior to exit.

Required:
The multiple of expected proceeds at exit to invested funds for the LBO investment. (5 marks)

(d) The coupon curve of prices for passthrough security for some months is as follows:

Coupon (%)	Price (Sh.)
7	94.00
8	97.06
9	99.50
10	102.60
11	105.25
12	106.19

Required:
The coupon curve duration for the 10% coupon passthrough. (3 marks)
(Total: 20 marks)

QUESTION THREE

(a) Evaluate three forms of internal credit enhancement as used in asset backed securities (ABS). (6 marks)

(b) Suggest two reasons why financial institutions originate synthetic balance sheet collateralised debt obligations (CDOs). (4 marks)

(c) The following information relates to property B which is eventually sold in year 10:

	Sh.
Purchase price	4,570,000
Expected net selling price	7,760,500
Expected gain on sale	4,710,500
Accumulated depreciation	1,520,000
Mortgage balance outstanding	1,140,000
Tax on depreciation recapture	30%
Tax on capital gains	5%

Required:
The after-tax equity reversion of property B. (4 marks)

(d) As a pension manager with Faraja Endowment Fund, you have made an investment in a venture capital fund known as "Hekima Fund" for 3 years commencing 2016. You have committed a capital of Sh.876 million and the performance of Hekima Fund is as shown below:

Year	Called down Sh."million"	Management fee Sh."million"	Operating results Sh."million"
2016	135	0.55	–95
2017	112	0.87	135
2018	337	1.39	455

You are also informed that the distribution waterfall calls for a 20% carried interest when the Net Asset Value (NAV) before distribution exceeds the committed capital.

Required:

(i) Calculate the year 2018 percentage management fee of the Hekima Fund. (3 marks)

(ii) Determine the net asset value (NAV) of the fund for the year 2018. (3 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Explain three classes of protective covenants provided in a venture capital arrangement aimed at safeguarding the investors' interests. (3 marks)

(b) (i) Describe three types of participants in the commodities market. (3 marks)

(ii) A pension fund seeks to gain long exposure to commodities using the swap market. They analyse the performance of a long position in a commodity index total return swap having monthly resets and a notional amount of Sh.25 million. Selected data on the commodity index for the year 2019 is as presented below:

Reference date	Index level
April (swap initiation)	3042.35
May	3282.23
June	3225.21

The settlement date was June 2019.

Required:

The amount to be received or paid by the party that is long in the commodity index total return swap. (3 marks)

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(c) A pool of mortgage pass-through securities is used as a collateral for collateralised mortgage obligation (CMO) selling at a premium. One tranche in the deal, Tranche X is selling at a discount and another tranche Y is selling at a premium.

Required:

(i) Explain why a slowdown in prepayments will tend to increase the value of the collateral. (2 marks)

(ii) Compare and contrast the effect of a slowdown in prepayments on the value of tranche X and Y respectively. (2 marks)

(d) As a financial analyst for Liz Fund Managers, you have gathered the following data on a collateralised mortgage obligation (CMO) structure using Monte Carlo Simulation Model based on 12% volatility:

	Option adjusted spread (OAS) Basis points (BPS)	Z-spread Basis points (BPS)	Effective duration
Collateral tranche	90	130	8.0
PAC I A	60	70	2.0
PAC I B	80	90	4.0
PAC I C	40	130	6.0
PAC I D	40	160	10.0
PAC II A	90	180	5.0
PAC II B	30	300	7.0
Support A S1	40	190	12.0
Support A S2	60	210	15.0

Where: PAC – Planned Amortisation Class

Required:

(i) Calculate the option cost for PAC I D, PAC II B and Support A S2. (3 marks)

(ii) Identify the PAC tranches that appear expensive in the above deal on a relative value basis. (2 marks)

(iii) Despite PAC II B low OAS of 30 basis points, explain why a yield buyer may be persuaded to purchase the PAC II B. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) In relation to hedge funds:

(i) Assess three difficulties which could be experienced in applying traditional portfolio analysis to value hedge funds. (6 marks)

(ii) Argue three cases in favour of hedge fund replication strategy to manage hedge funds. (6 marks)

(b) The current cash price of one barrel of Brent Crude Oil is Sh.10,000 while the three month future price is Sh.9,800 per barrel. The annual cost of funding is 4% and the annual storage cost is 5%.

Required:

The convenience yield. (2 marks)

(c) An analysts observes the following futures prices for an agricultural commodity trading on a global futures market:

Commodity	January 2020	February 2020	March 2020	April 2020
30 December 2019	57.98	61.04	62.09	62.35
31 January 2020		68.35	67.92	68.74
28 February 2020			61.10	61.41
31 March 2020				60.57

Required:

Calculate the following:

(i) Futures return for January 2020. (2 marks)

(ii) Spot return for February 2020. (2 marks)

(iii) The roll return for March 2020. (2 marks)

(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	.	.
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001	.	.	.	.
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001	.	.	.	.	.	.

* The factor is zero to four decimal places

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Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

*Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 29 November 2018. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Explain five characteristics of real estate as an alternative investment class. (5 marks)

(b) The following information relates to a certain office building in Naro town and which Kangaro Financial Services (KFS) is considering for valuation:

	Sh."000"
Gross potential rental income	700,000
Insurance and taxes	52,000
Utilities	36,000
Repairs and maintenance	46,000
Depreciation	80,000
Interest on proposed financing	36,000

Additional information:

1. Vacancy and collection losses is estimated at 4%.
2. Recently, there have been two office buildings sold in the same area:
   - The first building had a net operating income of Sh.1,000,000 and was sold for Sh.8,000,000.
   - The second building had a net operating income of Sh.450,000 and was sold for Sh.3,200,000.

Required:

(i) The net operating income (NOI) for the office building. (5 marks)

(ii) The appraised price of the office building using the income approach. (5 marks)

(c) An asset management firm is reviewing the following mortgage pool:

Loan	**Outstanding Mortgage balance Sh."000"**	**Mortgage rate (%)**	**Months remaining**
1	215,000	6.75	200
2	185,000	7.75	185
3	125,000	7.25	192
4	100,000	7.00	210
5	200,000	6.50	180

Required:

(i) The weighted average coupon (WAC) rate for the mortgage pool. (3 marks)

(ii) The weighted average maturity (WAM) for the mortgage pool. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain the term "J-curve effect" as used in private equity valuation. (2 marks)

(b) Highlight three differences between a "buyout investment" and a "venture capital investment". (3 marks)

(c) Examine four roles of third market and fourth market in alternative investments. (4 marks)

(d) A private equity fund has the following information about the yearly capital calls, operating results and distributions:

	Amount (Sh."million")					
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Capital called down	50	15	10	25	10	5
Realised results	0	0	10	35	40	80
Unrealised results	-5	-15	15	10	15	25
Distributions	-	-	-	25	45	75

Additional information:

1. The management fee is set at 2%.
2. The carried interest is 20%.
3. The fund's committed capital is Sh.125 million.

Required:

The fund's net internal rate of return (IRR). (8 marks)

(e) The following information relate to a venture capital deal.

Terminal value (at time of exit)	Sh.5,000,000
Time to exit event	4 years
Amount of investment	Sh.1,000,000
Discount rate used by investors	25%
Number of existing shares owned by the entrepreneurs	200,000

Required:

The price per share of the venture capital deal. (3 marks)

(Total: 20 marks)

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QUESTION THREE

(a) Distinguish between "contango" and "backwardation" in relation to commodities. (2 marks)

(b) An asset is priced at Sh.5,000. The risk-free rate is 9%. Futures contract on the asset expires in 45 days.

Assume a 365-day year.

Required:

(i) The futures price assuming that the underlying asset has no storage cost, cash flow or convenience yield. (2 marks)

(ii) The futures price assuming that the future value of storage cost on the underlying asset at expiration is Sh.500. (2 marks)

(iii) The futures price assuming that the future value of positive cash flows on the underlying asset is Sh.150. (2 marks)

(c) An index provider has created a new investable index that tracks the hedge fund industry. Any fund that follows a long/short strategy can enter the index. The index provider places new constituents in the index at the end of each year and incorporates the new fund's track record in the database.

In relation to the above statement, evaluate three biases inherent in the hedge fund databases that might distort the historical performance of the index. (6 marks)

(d) Cool Breeze Capital (CBC) is considering a leveraged buyout (LBO) of Optimax Capital which has been experiencing poor operating results over the last few years. The revenue and earnings before interest tax depreciation and amortisation (EBITDA) for Optimax Capital have been declining rapidly but CBC believe it has found a new management team that will stabilise Optimax Capital.

Optimax Capital currently has EBITDA of Sh.250 million and CBC believes that the new management team could keep EBITDA constant for the next five years.

CBC has obtained debt financing of Sh.750 million at an interest rate of 10% and Optimax Capital expects working capital to be a source of funds at a cost of Sh.6 million per year. It also requires capital expenditure of Sh.35 million per year. The corporation tax rate is 30%.

CBC plans to sell Optimax Capital after five years at an enterprise value to EBITDA multiple of 6.0x.

Additional information:

1. Assume that excess cash is not used to repay debt and instead accumulates on the balance sheet.
2. There are no transaction fees, zero minimum cash required and the property, plant and equipment on the balance sheet remain constant for the next five years.

Required:

The purchase price required for CBC to obtain a 3.0x multiple of invested capital (MOIC). (6 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Onesmus Nyandiko is the manager of a portfolio containing mortgage pass-through securities. He is reviewing output of his firm's analytical system for several pass-through securities that are in the portfolio. Below is a portion of the report for three pass-through securities:

Price based on an assumed interest rate volatility of:

Pass-through (%)	11	13	15	16
Security 1	100	98	95	93
Security 2	92	90	88	87
Security 3	102	104	106	107

Required:

Comment on whether there is an error in the analytical system. (3 marks)

(b) Describe two ways in which a credit default swap could be settled. (4 marks)

(c) Explain the following tranches of a collateralised mortgage obligation (CMO):

(i) Sequential pay tranche. (1 mark)

(ii) The accrual tranche. (1 mark)

(iii) The planned amortisation class (PAC) tranche. (1 mark)

(iv) The support tranche. (1 mark)

(d) A collateralised debt obligation (CDO) has a Sh.100 million structure. The collateral consists entirely of bonds with 10 years remaining until maturity and a coupon rate which is equal to the 10 years treasury rate plus 300 basis point. The senior tranche represent Sh.65 million and carries a floating coupon rate equal to London Interbank Offered Rate (LIBOR) plus 60 basis point. There is Sh.7 million mezzanine tranche and has a fixed coupon equal to the treasury rate at origination plus 100 basis point. The manager of the trust has entered into an interest rate swap under which the trust will pay an annual fixed rate equal to the treasury rate plus 80 basis points and receive LIBOR. The notional amount for this swap is Sh.65 million.

The 10 year treasury rate is 6% at the time of origination.

Required:

Determine the return of the equity tranche that is created. (9 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Discuss four common features of alternative investments. (4 marks)

(b) Describe two categories of infrastructure investments as a form of alternative investments. (2 marks)

(c) Explain the following terms in the context of private equity:

(i) Equity dry powder. (1 mark)

(ii) Mezzanine debt. (1 mark)

(iii) Distribution waterfall. (1 mark)

(d) Faida Hedge Fund has Sh.100 million assets under management (AUM) at the start of year 1. The Fund grows to Sh.120 million at the end of year 1. At the end of year 2, the value of the fund had declined to Sh.90 million. However, the value of the fund increased to Sh.140 million at the end of year 3.

The fund charges a management fee of 2% based on AUM and a 20% incentive fee with a high-watermark (HWM) provision for incentive fees.

Required:
Return to investors at the end of each year. (6 marks)

(e) A government sponsored mortgage backed security (MBS) is a 9% passthrough security issued on 1 March 2017 with a remaining term of 359 months. The 1 June 2018 and 1 July 2018 pool factors are 0.85150625 and 0.84732282 respectively.

Required:
The prepayment speed for the month of June 2018 using Public Securities Association (PSA). (5 marks)

(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	*	*
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001	*	*	*	*
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001	*	*	*	*	*	*

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 24 May 2018. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Summarise three reasons why many private equity sponsors tend to favour mezzanine financing over high-yield funding. (3 marks)

(b) Eliud Mulee inherited an apartment building. He initially intended to keep the building, but his lawyer suggested that he should consider selling the building and buy some undeveloped land at the outskirts of the city. The owner of the land had planned to build a shopping mall but now he is being forced to sell the land at a price below its appraised value.

Mulee's lawyer made the following comments:

1. The high occupancy rate of your apartment building exceeds the occupancy rate of comparable local apartment buildings. As a result, the apartments will not have much potential for price appreciation.
2. Although the investment in the undeveloped land will not provide immediate cash flow, its long-term potential for price appreciation is significant because one can develop a shopping mall on the land.

Required:
Critique each of the above statements. (4 marks)

(c) An alternative investment analyst gathers the following values for distributions, contributions and net asset value (NAV) for a Ugandan private equity fund named Fox Fund 1 that belongs to the vintage year 2011:

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Fox Fund 1 (Sh."million")	–200	–800	200	–2,000	–600	2,000	3,500

Positive numbers correspond to the years in which investors received net distributions while the negative numbers correspond to years in which investors made net contributions. The figure for 2017 corresponds to the net asset value at the end of that year.

Required:
Compute the following for the fund:

(i) Interim internal rate of return. (3 marks)

(ii) The total value to paid-in ratio. (2 marks)

(iii) The distribution to paid-in ratio. (2 marks)

(iv) The residual value to paid-in ratio. (2 marks)

(d) Samuel Mwangi has invested in several real estate holdings in a country with a capital gains tax rate of 30%. One of these holdings is land with a current market value of Sh.15 million. He intends to utilise its value to generate liquidity. Samuel is considering monetising his property either through mortgage financing or sale and lease back.

The property has a cost basis for tax purposes equal to 15% of its current market value. He can achieve a loan-to-value ratio of 75% through a mortgage financing at an interest rate of 8%. Lease payments and mortgage financing are both deductible for tax purposes. He wants to determine how much liquidity each method will generate upon closing.

Required:
Calculate the initial net proceeds if Samuel opts to use:

(i) Mortgage financing method. (2 marks)

(ii) Sale and lease back method. (2 marks)

(Total: 20 marks)

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QUESTION TWO

(a) In the context of participants in the alternative investments market, evaluate four advantages of separately managed accounts (SMAs) relative to mutual funds. (4 marks)

(b) Explain three factors that could affect prepayments in a mortgage pass-through security. (3 marks)

(c) In relation to asset backed securities (ABS), differentiate between "prepayment tranching" and "credit tranching". (2 marks)

(d) An alternative investment firm is considering equity investments in real estate. The two options under consideration are as illustrated below:

Option 1: Investment in a public real estate investment trust (REIT).
Option 2: Equity investment in a public real estate operating company (REOC)

Option 1: REIT

Recent net operating income (NOI)	Sh.140 million
Non-cash rents	Sh.5 million
Full year adjustment for acquisition	Sh.5 million
Other assets	Sh.50 million
Total liabilities	Sh.300 million
Current market price per share	Sh.125
Shares outstanding	15 million
Going in capitalisation rate	7.0%
Net operating income growth rate	2.5%

Option 2: REOC

Expected Adjusted Funds From Operations (AFFO) in year 8	Sh.13.5 million
Holding period	7 years
Present value of all dividends for 7 years	Sh.39.7 million
Shares outstanding	1.0 million
Capitalisation rate	7.0%
Growth rate from year 8	2.50%

Additional information:

1. The REOC terminal value at the end of seven years is to be based on a price-to-AFFO multiple of 12 times.
2. The real estate market expectations are that mortgage rates are likely to remain low for at least seven more years and the economy is expected to enjoy above average growth rate.

Required:

(i) Using the net asset value approach, determine whether the REIT identified in Option 1 is fairly priced. (3 marks)

(ii) Using the discounted cash flow approach, calculate the estimated value per share of Option 2. (3 marks)

(iii) Provide one reason why Option 2 would be preferred over Option 1. (1 mark)

(e) An asset management firm is reviewing various mortgage backed securities (MBS) and is interested in calculating the single monthly mortality (SMM) rates. The firm is using the Public Securities Association (PSA) standard prepayment benchmark.

Required:

(i) The SMM for month 22 assuming a 140PSA. (2 marks)

(ii) The SMM for month 200 assuming a 90 PSA. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Discuss four factors that have contributed to the convergence of private equity and hedge fund strategies in the global markets. (4 marks)

(b) Cetric Mayfair hedge fund employs the following three hedge fund strategies:

1. Quantitative long/short fund.
2. Arbitrage/relative value fund.
3. Fund of funds

Required:

For each of the above hedge fund strategies, propose:

(i) The underlying assumptions. (3 marks)

(ii) The investment strategies. (3 marks)

(iii) The potential downside exposures. (3 marks)

(c) A portfolio consists of 100 credits, each having a notional value of Sh.10 million. An investor is interested in a tranche having the notional value of Sh.50 million with an attachment of 5% and a width of 2%. The spread is 150 basis points. The recovery rate is 40%. The tranche will not experience any loss until there are nine defaults.

Required:

(i) Calculate the amount paid by the protection seller to the protection buyer. (3 marks)

(ii) Calculate the amount paid by the protection buyer to the protection seller. (1 mark)

(d) A fund has invested in a two commodity portfolio, A and B, with a beginning value of Sh.100 million. Over the upcoming two periods, the return on commodity A will be 100% in period 1 and – 50% in period 2. The rate of return on commodity B will be 0% in period 1 and 0% in period 2.

The allocation to each commodity is 50%. The portfolio is rebalanced after each period.

Required:
Calculate the geometric return of the portfolio. (3 marks)
(Total: 20 marks)

QUESTION FOUR

(a) Explain the following terms as used in private equity investment:

(i) Carried interest. (1 mark)

(ii) Clawback clause. (1 mark)

(b) Discuss two uses of credit derivatives. (2 marks)

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(c) The asset backed securities (ABS) market has grown in the past few years partly as a result of credit enhancements to ABS.

Required:

(i) In relation to the above statement, differentiate between a "letter of credit" and "early amortisation" (2 marks)

(ii) Explain to the investor the risk associated with relying exclusively on letter of credit and early amortisation. (2 marks)

(d) SCM Capital is a hedge fund with an initiator investment capital of Sh.100 million. The hedge fund charges a 2% management fee based on assets under management at year end and a 20% incentive fee. In its first year, SCM Capital has a 30% return. The fee structure specifies a hurdle rate of 5% and the incentive fee is based on returns in excess of the hurdle rate. The performance fee is calculated net of the management fee.

In the second year, the fund value declines to Sh.110 million. The fee structure in the second year includes the use of a high water mark (HWM). In the third year, the fund value increases to Sh.128 million. The fee structure in the third year includes the use of a HWM.

Required:

(i) Calculate the arithmetic mean annual return over the three-year period based on the fee structure specified above. (5 marks)

(ii) Calculate the total fee paid to SCM Capital over the three-year period. (1 mark)

(e) Simon Meso decided to sell one of his income producing properties in January 2018. He decided to use a direct capitalisation approach and a discounted cash flow approach to set the asking price for the property. The property information is provided below:

Property information

Capitalisation rate	13%
Mortgage:	none
Commissions	none

Year	Net Operating Income (Sh."000")
2018	43,300
2019	45,725
2020	43,271
2021	50,945

Required:

(i) Estimate the property's current value using the direct capitalisation method. (1 mark)

(ii) Discuss two shortcomings of the underlying assumptions and methodology of the direct capitalisation approach to valuation. (2 marks)

(iii) Calculate a discounted cash flow valuation of the property given that the property is sold at the end of year 2021. (3 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Outline one limitation of cash flow duration in the mortgage backed securities market (MBS). (1 mark)

(b) In relation to commodities, discuss three misinterpretations of the roll return. (3 marks)

(c) An investor of assets backed securities (ABS) and mortgage backed securities (MBS) is concerned that there is a possibility of interest rates declining in the near future.

Required:

Explain the effect of the following assuming interest rates decline as expected:

(i) The cash flows of home-equity ABS. (2 marks)

(ii) The cash flows of the automobile receivable ABS. (2 marks)

(d) An analyst gathers the following information for collateralised mortgage obligation (CMO) tranches:

Tranche	Option Adjusted Spread (basis points)	Z-Spread (basis points)	Effective duration
1	68	85	2.60
2	71	91	2.90
3	73	136	8.25

Required:

Determine the most expensive tranche. (4 marks)

(e) James Ochieng is considering investing in two bonds, A and B. Bond A has a duration of 5.6 years and a convexity of 38.2. Bond B has a duration of 7.3 years and a convexity of 38.2.

Required:

Determine the bond that is more exposed to interest rate risk. (2 marks)

(f) A collateralised mortgage obligation (CMO) security has a floating rate tranche C. Tranche C has been split to create a floater with a principal of Sh.80,416,667 and an inverse floater with a principal of Sh.16,083,333 as shown below:

Tranche		Par Amount (Sh.)	Coupon (%)
A		194,500,000	7.50
B		36,000,000	7.50
C	Floater	80,416,667	
	Inverse floater	16,083,333	
D		73,000,000	7.50

Required:

(i) Determine the capitalisation rate for the inverse floater if the coupon rate for the floater is 1 month LIBOR plus 1%. (3 marks)

(ii) Determine the capitalisation rate on the floater assuming that the coupon formula for the floater is 1 month LIBOR plus 1%, and a floor of zero is imposed on the inverse floater. (3 marks)

(Total: 20 marks)

.....

Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

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Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 30 November 2017. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Explain four return characteristics that distinguish alternative investments from traditional investments. (4 marks)

(b) (i) Explain four market imperfections that could limit an investor's ability to implement arbitrage transaction in the commodity market. (4 marks)

(ii) Discuss three theories of commodity futures returns. (6 marks)

(c) Theresa Mwende works for a firm that deals with non-conforming residential mortgages. She has assembled Sh.80 million pool of 30 year-fixed rate mortgages with unusually high loan-to-value (LTV) ratios. Theresa Mwende meets with a potential investor who inquires about the pool created from these securities. Mwende explains to the client that the pool has a weighted average coupon (WAC) of 7.10% and a weighted average maturity (WAM) of 356 months and that under current market conditions, prepayments are expected at 310 PSA (Public Securities Association Standard Prepayment Model). Mwende also presents a table showing pool cash flow estimates for a different prepayment assumption. An extract of that table is given below:

Mortgage pool monthly cash flow estimates

Months from now	Mortgage payment	Outstanding balance	Net interest	Scheduled principal
24	Sh.327,321	Sh.47,563,831	Sh.281,419	Sh.45,901

The single monthly mortality (SMM) prepayment rate is assumed to be 2.1482%.

Required:

(i) The conditional prepayment rate (CPR) for the pool. (3 marks)

(ii) The expected prepayment amount for month 24 of the pool's life. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) (i) Real estate has been a very large and important portion of wealth for thousands of years. However, there are some aspects of real estate that could discourage its inclusion in an investment portfolio.

In relation to the above statement, discuss three potential disadvantages of investing in real estate. (6 marks)

(ii) Highlight three advantages of real estate investment trusts (REITs) ownership compared to direct real estate ownership. (3 marks)

(b) A real estate lender agreed to make a 10% interest-only (IO) loan on a property that was recently appraised at Sh.1,200,000 as long as the debt-to-service coverage ratio (DSCR) is at least 1.5 and the loan-to-value (LTV) ratio does not exceed 80%. The property has a net operating income of Sh.135,000.

Required:

The equity capitalisation rate (Equity dividend rate) given that the property is purchased for the above appraised value. (5 marks)

(c) Upperhill Tower is a 200,000 square foot residential apartment building located in Nairobi, Kenya. The building has an effective age of 10 years, while its total economic life is estimated at 40 years. The building has a structural problem that is not feasible to repair. The building also needs a new roof at a cost of Sh.1 million. The new roof will increase the value of the building by Sh.1,300,000.

The bedrooms in each apartment are too small, thus rents are Sh.400,000 a year lower than the competing properties.

The negative impact on rents is estimated to be Sh.600,000 per year due to traffic congestion, power interruption and inadequate water supply and dumpsite being located nearby.

Due to recent construction of competing properties, vacancy rates have increased significantly resulting in an estimated loss in value of Sh.1,200,000.

The cost to replace Upperhill Tower is estimated at Sh.400 per square foot plus builder's profit of Sh.5,000,000. The market value of the land is estimated at Sh.20,000,000. The appropriate discount rate is 8%.

Required:
Estimate the value of Upperhill Tower using the cost approach. (6 marks)

(Total: 20 marks)

QUESTION THREE

(a) Summarise three forms of hedge fund regulation. (3 marks)

(b) Assess three benefits of investing in mezzanine debt. (6 marks)

(c) In relation to leveraged buyouts (LBOs), explain the term "cash sweep". (1 mark)

(d) The following information and assumptions relate to a leveraged buyout (LBO) structure:

Assumptions	**Year-1 to Year-5**
Sales growth	5.0%
Cost of goods sold as a percentage of sales	60.0%
Selling, general and administration expenses as a percentage of sales	15.0%
Depreciation as a percentage of sales	5.5%
Transaction fee amortisation	Sh.1 million each year
Tax rate	30.0%
Capital expenditure as a percentage of sales	5.5%
Increase in working capital as a percentage of increase in sales	7.0%

Uses of funds:	**Sh. "million"**
Purchase price	200.0
Transaction costs	5.0
Total	205.0
Sources of funds:	
Senior debt at 9.0%	45.0
Junior debt at 13.0%	100.0
Equity	60.0
Total	205.0

	Year 0 **Sh. "million"**
Net sales	170.0
Cost of goods sold	(102.0)
Selling, general and administration expenses	(25.5)
Depreciation	(9.4)
Operating income	33.1
Transaction fee amortisation	-
Earnings before interest and taxes	33.1

Required:
Determine for the five years, the ending balance for the:

(i) Senior debt. (5 marks)

(ii) Junior debt. (5 marks)

(Total: 20 marks)

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QUESTION FOUR

(a) Evaluate three limitations of investing in funds of hedge funds. (6 marks)

(b) The exit value is a critical element in the return for the private equity firm and is considered carefully before the investment is undertaken. The means and timing of the exit strongly influence the exit value.

Required:
Explain three exit routes that private equity firms use. (6 marks)

(c) Protus Murumba, a Chief Investment Officer at an endowment fund is reviewing the following investment data relating to an investment in energy commodities:

Year	GSCI total annul return (%)	GSCI collateral yield (%)	GSCI Roll yield (%)	GSCI Spot annual return (%)
1	29.1	9.6	?	6.1
2	–30.5	?	–14.2	–24.3

Note: GSCI is Goldman Sachs Commodity Index, a composite index of commodity sector returns which represents a broadly diversified, unleveraged long-only position in commodity futures.

Required:

(i) The roll yield for year 1. (2 marks)

(ii) The collateral yield for year 2. (2 marks)

(iii) Murumba notes that the collateral yield is positive in both scenarios although the GSCI total annual return for year 2 is –30.5%. He asks for an explanation with regard to the positive yield.

Justify the positive collateral yield by discussing the concepts of margin and implied yield. (2 marks)

(iv) A consultant tells Murumba "commodities exhibit positive event risk".

Justify the consultant's statement by discussing the relationship between commodity prices and event risk. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Explain five stages of venture capital fund development. (10 marks)

(b) Alex Kilonzo tells Ann Kipruto that he has seen exciting data on the performance of market-neutral, convertible arbitrage, and global macro hedge funds. Kilonzo states "The Sharpe ratios of all of these hedge fund strategies are much higher than for traditional equities or bonds, which means they have a greater risk-return profile. We should definitely plan a major investment in hedge funds".

Kipruto responds "There are several reasons that the Sharpe ratio may be misleading".

Required:

(i) Advise Ann Kipruto on four situations that could cause an upward bias in the calculation of the hedge fund Sharpe ratio. (4 marks)

(ii) Evaluate two reasons that statistically indicate that the Sharpe ratio is not the most appropriate measure of risk for the hedge funds. (2 marks)

(c) A hedge fund manager purchases 10 convertible bonds with a par value of Sh.1,000, a coupon of 7.5%, and a market price of Sh.900. The conversion ratio for the bonds is 20. The hedge ratio for the bonds is 0.5. The fund manager receives a short rebate of 4.5%. The current price of the underlying ordinary shares is Sh.45 per share. The manager pays for the 10 bonds without using any leverage. Later, the price of the ordinary share increase to Sh.47 per share, and the price of the convertible bond increases to Sh.920.

Required:
Compute the holding period return (HPR) for the convertible bond arbitrage transaction. (4 marks)

(Total: 20 marks)

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 25 May 2017. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Explain how the following primary structures distinguish alternative investments from other traditional investments:

(i) Regulatory structure. (1 mark)

(ii) Trading structure. (1 mark)

(iii) Compensation structure. (1 mark)

(iv) Securities structure. (1 mark)

(v) Institutional structure. (1 mark)

(b) (i) Analyse two factors which could have contributed to the creation of collateralised debt obligations (CDO's). (2 marks)

(ii) Highlight three economic advantages of using a synthetic collateralised debt obligation (CDO) structure compared to a cash CDO structure. (3 marks)

(c) Describe two types of private equity real estate investment indices. (2 marks)

(d) Hedge funds across the globe have come under increasing pressure in regard to their operations including their fee structure.

Required:
Argue three cases against hedge fund fee structure. (3 marks)

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(e) The net operating income (NOI) of a leased property is expected to be Sh.1 million per year over the next four years. At the beginning of year five, the NOI is expected to increase to Sh.1.2 million and to grow at a rate of 3% per annum. The property is sold after four years. The investors require a 13% return.

Required:
The value of the property today. (5 marks)

(Total: 20 marks)

QUESTION TWO

(a) Describe the role played by each of the following outside service providers in the creation and operation of alternative investments:

(i) Advocates. (1 mark)

(ii) Hedge fund infrastructure. (1 mark)

(iii) Consultants. (1 mark)

(iv) Fund administrators. (1 mark)

(v) Depositories and custodians. (1 mark)

(b) List three reasons that would motivate a portfolio manager to include hedge funds in a portfolio. (3 marks)

(c) Explain the effect of decline in interest rates on each of the following types of collateralised mortgage obligations (CMOs):

(i) Planned amortisation class (PAC). (1 mark)

(ii) Support bonds. (1 mark)

(d) The following information relates to a collateralised mortgage obligation (CMO) structure backed by 8% collateral:

Tranche	Par amount (Sh.million)	Coupon rate (%)
A	300	6.50
B	250	6.75
C	200	7.25
D	250	7.75

A client wants a notional interest only (IO) with a coupon of 8%.

Required:
The notional amount for this notional interest only (IO) tranche. (6 marks)

(e) Green Delivery Ltd. (GDL) has defaulted on its senior unsecured debt. Popat Finance Ltd. (PFL) owns Sh.5 million of bond series X as well as Sh.4 million in credit default swap (CDS) protection. Bond X is now trading at 25% of the par value. Snowline Securities Ltd. (SSL) owns Sh.10 million of bond series Y, also senior unsecured debt which is trading at 30% of the par value. SSL has Sh.9 million in CDS protection on bond Y.

Required:
The potential CDS payout amounts to:

(i) Green Delivery Ltd. (2 marks)
(ii) Snowline Securities Ltd. (2 marks)
(Total: 20 marks)

QUESTION THREE

(a) Describe the following types of alternative real estate investment vehicles:

(i) Exchange-traded funds (ETFs). (1 mark)
(ii) Commingled real estate funds (CREFs). (1 mark)
(iii) Syndications. (1 mark)
(iv) Joint ventures. (1 mark)
(v) Open-end real estate mutual fund. (1 mark)

(b) Commodities are often viewed as an asset class that helps investors diversify a portfolio of traditional assets (shares and bonds) due to low return correlation between commodities and traditional assets.

Required:
In relation to the above statement, argue four cases why commodity returns might have low correlation relative to traditional assets. (4 marks)

(c) (i) Outline three benefits of applying price-to-funds from operations (PFFO) and price-to adjusted funds from operations (PAFFO) multiple in the valuation of a real estate investment trust (REIT) and a real estate operating company (REOC). (3 marks)

(ii) A financial analyst has gathered the following information relating to a real estate investment trust (REIT):

	Sh.
Non-cash (straight line) rent.	207,430
Depreciation	611,900
Recurring maintenance type capital expenditures and leasing commission	550,750
Adjusted funds from operations (AFFO)	3,320,000
AFFO per share	3.32

Required:
The REIT's fund from operations (FFO) per share. (4 marks)

(d) Suppose that wheat is trading in the spot market at Sh.800 per bushel since bad weather caused a decrease in supply during the previous harvest. Market participants expect a bountiful harvest in about six months which is expected to drive market prices down to Sh.500 per bushel. Forward prices with delivery dates after the next harvest are trading at the range of Sh.500 per bushel.

Required:
Explain how an arbitrageur could attempt to profit from the above prices. (4 marks)
(Total: 20 marks)

QUESTION FOUR

(a) (i) Argue three cases for the fast growth and concentration of the hedge fund industry in the recent past. (6 marks)

(ii) Evaluate three disadvantages of investing in funds of funds. (3 marks)

(b) Identify three possible ways through which a leveraged buyout (LBO) firm could generate its revenue. (3 marks)

(c) Burbon Limited, a venture capital firm will require Sh.3 million in the first round of financing and a second round of financing three years later of Sh.2 million to finance the firm's expansion to the size expected at exit. The firm is expected to be worth Sh.40 million after five years. The founders will hold 1 million shares.

The relevant discount rate is 40% for the first three years and 30% for the last two years.

Required:
The price per share of Burbon Ltd. at the time of second round of financing. (8 marks)
(Total: 20 marks)

QUESTION FIVE

(a) Examine three reasons that could motivate an entity to enter into a credit default swap agreement. (3 marks)

(b) Describe three distressed debt investment strategies. (3 marks)

(c) Propose four strategies which could be used by leveraged buyout (LBO) firms to exit investments. (4 marks)

(d) A 12-year-old industrial property is being valued using the cost approach. The appraiser feels that it has an effective age of 15 years based on its current condition. For instance, there are cracks in the foundation that are not feasible to repair (incurable physical depreciation). That is, it would cost more to try to repair these problems than the value that would be created in the property. The appraiser believes that the industrial property has 60-year remaining economic life (75-year total economic life).

The building was constructed using a greater ceiling height than users require in the current market (super-adequacy). It would cost Sh.27 million to reproduce (reproduction cost) the building with the same ceiling height but Sh.25 million to construct a replacement property (replacement cost) with the same utility but a normal ceiling height. The higher ceiling results in increased heating and air conditioning costs of Sh.50,000 per annum. A capitalisation rate that would be used to value the property would be 10 per cent.

The building was designed to include a cafeteria that is no longer functional (functional obsolescence). This area can be converted to usable space at a conversion cost of Sh.25,000 and it is believed that the value of the property would increase by at least this amount (curable functional obsolescence).

The roof needs to be replaced at a cost of Sh.250,000 and other necessary repairs amount to Sh.50,000. The costs of these repairs will increase the value of the building by at least Sh.300,000 (curable physical depreciation).

The road providing access to the property is a two-lane road, whereas newer industrial properties are accessible by four-lane roads. This has a negative impact on rents (locational obsolescence), which is estimated to reduce the net operating income (NOI) by Sh.100,000 annually.

Based on comparable sales of vacant land, the land is estimated to be worth Sh.5 million.

Required:
Estimate the value of the land using the cost approach. (10 marks)
(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

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CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 24 November 2016. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Describe the following classes of modern alternative investments:

(i) Managed futures. (1 mark)

(ii) Hedge funds. (1 mark)

(iii) Distressed securities. (1 mark)

(b) Highlight three errors that an investment analyst could make when valuing real estate investments trusts (REITs) using the discounted cash flow method. (3 marks)

(c) An arbitrageur trades gold when the spot price is 400 United States Dollars (USD) per ounce (oz) while one-year futures contract price is USD 460/oz. An investor can borrow or lend funds at a rate of 10% per annum.

Assume that the transaction cost is 3%.

Required:
The arbitrage profit from this transaction. (6 marks)

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(d) A single tenant office building was leased six years ago at a price of Sh.2,000,000 per year. The next rent review occurs in two years time. The estimated rental value (ERV) in two years based on the current market conditions is Sh.3,000,000 per year.
The all risk yield cap rate for comparable fully - let properties is 7%. Due to lower risk, the appropriate rate to discount the term rent is 6%.

Required:
The value of the office building. (5 marks)

(e) Ten equally weighted representative paths are used in the Monte Carlo simulation model. For the different spreads used, the present value of each representative path for a collateralised mortgage obligation (CMO) tranche is as shown below:

	Present value if spread is:		
Representative path	**75 basis points (bps)**	**80 basis points (bps)**	**85 basis points (bps)**
1	72	62	65
2	77	75	72
3	81	79	76
4	84	81	77
5	69	65	63
6	83	81	77
7	91	87	83
8	87	85	81
9	69	66	62
10	93	59	56

The market price of tranche Y is 74.

Required:
The option adjusted spread (OAS) of tranche Y. (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) (i) Evaluate three contrasts between "venture capital" and "buyouts" as used in private equity investments. (3 marks)

(ii) Venture capital firms have become increasingly specialised as a result of the intensive knowledge base required to invest in the technology, telecommunications, and biotechnology industries. Specialisation has expanded further to include the stage of investment in the life cycle of a start-up company. Unfortunately, specialisation has led to concentrated portfolios, the very anathema of reduced risk through diversification. This concentration has led to the need for higher risk premiums.

Required:
With reference to the above statement, assess three main risks that could contribute to the higher required risk premiums for venture capital. (3 marks)

(b) Discuss three considerations that should be taken into account when forecasting long-term growth rates for real estate investment trusts (REITs) and real estate operating companies (REOCs) using the discounted cash flow approach. (3 marks)

(c) Ali Musa is an alternative investments manager at Venus Capital. He is considering analysing a two-tranche (a PAC 1 tranche and a support tranche) from a collateralised mortgage obligation (CMO) that was issued 18 months ago. When the CMO was issued, the initial collar of the PAC 1 tranche was 150-400 PSA. He estimates the change in the average life of each tranche as the prepayment speed varies, assuming the prepayment speed stays at that speed until the tranche matures. The results are as shown below:

Average life of tranches XX and tranche YY for varying prepayment speeds:

	Average Life	
PSA speeds	**Tranche XX**	**Tranche YY**
0	21.9	12.2
50	17.5	8.9
100	13.2	5.1
150	9.1	5.1
200	4.3	5.1
250	3.6	5.1
300	2.9	5.1
350	2.0	4.7
400	1.4	3.9

Note:
- PSA is the public securities association, a model for analysing mortgage-backed securities.
- PAC is the planned armortisation class.

Required:
(i) Determine the most likely support tranche. (2 marks)

(ii) Determine the effective collar of PAC 1 tranche. (2 marks)

(d) A real estate investment with an initial cost of Sh.45 million was sold after five years at a price of Sh.75 million. The cost associated with the sale was Sh.5 million, and the tax depreciation in each year was Sh.2 million. At the time of the sale, the outstanding mortgage balance will be Sh.34 million. The tax rate on recaptured depreciation and the long-term capital gain tax rate is 30%.

Required:
The equity reversion after tax for this real estate investment. (3 marks)

(e) Stela Wambua is conducting due diligence on a hedge fund for a pension fund. She gathers the following information relating to the structure of the fund:

1. The fund employs three people – two principals; Samuel Mulati and John Omulundo, and an administrative assistant. Samuel Mulati's prior work experience is 10 years as an equity analyst at Jeremy Investment Bank and prior to that as an associate at a law firm. He holds Bachelor of Business Administration (BBA) and Bachelor of Laws (LLB) degrees.
2. John Omulundo worked for three years as an equity fund manager at a medium size mutual fund. Prior to that, he was a corporate finance associate at a start up investment bank.

3. The principals are employed on contract basis.
4. The fund's relationship with its prime broker extends back two years. The fund has used only one prime broker since it was formed. The prime broker is a prestigious firm ranked number two by rating agencies in the brokerage business.

Hedge fund strategy:

- The fund invests in both fixed income and equities markets.
- The fund buys 10-year Treasury note and borrows short-term loans abroad in markets that have particularly low interest rates to earn, currently, a positive spread.
- The fund conducts merger arbitrage involving the securities of the target and acquirer.

Legal strategy:
The fund has a 1 and 20 fee structure and a two-year lock-up period.

Required:
Based on the above information, analyse four risk factors associated with this hedge fund investment. (4 marks)
(Total: 20 marks)

QUESTION THREE

(a) (i) Research and Development (R & D) and patents provide an important insight into intellectual property (IP) in the context of the establishment and preservation of property rights. Unlike tangible assets, for which property rights are typically indicated by possession and usually clearly established, IP often raises challenges regarding its potential non-excludability.

Required:
In the context of the above statement, summarise five risks associated with investment in patents as a category of intellectual property investment. (5 marks)

(ii) Institutional investors have recently expressed an increased interest in the returns produced by direct ownership of real assets, and in particular farmland assets.

Required:
In relation to the above statement, discuss three factors that have motivated institutional investors to venture into farmland investment. (6 marks)

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(b) Highlight two assumptions of models used in the valuation of mortgage-backed securities. (2 marks)

(c) Describe two conditions necessary to value a security using Monte Carlo simulation model. (2 marks)

(d) A venture capital fund manager is considering investing Sh.25 million in a new project that he believes would pay Sh.120 million at the end of five years. The cost of equity for the investor is 15%. The estimated probability of failure is presented below:

Year	1	2	3	4	5
Probability of failure	0.20	0.20	0.17	0.15	0.15

Note: The above probabilities are conditional probabilities since they represent the probability of failure in year N, given that the firm has survived to year N.

Required:

(i) The net present value (NPV) of the potential investment. (4 marks)

(ii) Comment on the decision you would make based on the results obtained in (d)(i) above. (1 mark)
(Total: 20 marks)

QUESTION FOUR

(a) With respect to commodities markets, describe the following indices:

(i) Value-based index. (1 mark)

(ii) Quantity-based index. (1 mark)

(iii) Total return index. (1 mark)

(iv) Excess return index. (1 mark)

(b) (i) Discuss three functions of a private equity fund manager. (3 marks)

(ii) Describe three differences between private equity fund and quoted equity fund. (3 marks)

(c) Furaha Property Investment Limited is intending to purchase a complex of 20 specialty retail shops. At this time, 18 units are occupied under graduated leases with five years currently remaining, and two units are vacant. Each of the units measures approximately 2,000 square feet. Under the existing leases, current rents (for year 2016) are in line with market rates at Sh.12 per square foot a year, and all lease agreements are reviewed at the beginning of each year. An analyst, Fatuma Juma who works for Furaha Property Investment Limited has assembled the following facts to assist her in valuation of the property which is offered at Sh.4,500,000:

1. Under the graduated lease provision, rents will increase at a rate of 5% per year in line with expectations for the commercial rental market.
2. Vacancy rates of 10% are considered typical in this sector.
3. The current tax rate is Sh.18.50 per Sh.1,000 of assessed valuation. The property is assessed for tax purposes at Sh.4 million. Neither the tax rate nor assessed value is expected to change in the next one year.
4. The landlord is responsible for all real estate taxes, exterior maintenance, comprehensive insurance, management expenses and repairs or replacements.
5. The following cost elements are expected to increase at a rate of 3% per year for the foreseeable future:

2016 Cost Elements

- Maintenance: General maintenance costs are Sh.500 per month.
- Insurance: Annual premium for comprehensive insurance is Sh.10,000.
- Management: Annual management expenses are Sh.25,000.
- Repairs: Allowance for repairs and replacement is Sh.15,000 per year.

6. Recent sales price and projected net income for properties comparable to Furaha Property Investment Limited are shown below:

	Property A	**Property B**	**Property C**
Price (Sh.)	3,525,000	4,875,000	2,350,000
Net operating income (Sh.)	246,750	438,750	188,000

7. Fatuma Juma intends to consider an alternative capitalisation rate using a band of investment technique. If the investment is made, Furaha Property Investment Limited will pay 20% in cash and finance the remainder over a period of 30 years. Given the prevailing terms of 7% a year on a 30-year mortgage with monthly payments, the mortgage constant will be 0.0719.

8. Fatuma Juma believes that the equity capitalisation rate is 10%.

Required:

(i) Furaha Property Investment Limited's net operating income (NOI) for year 2017. (5 marks)

(ii) The investment value of the property using the direct capitalisation approach. (3 marks)

(iii) The overall capitalisation rate using the band of investment technique. (2 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Evaluate two managed futures trading strategies. (4 marks)

(b) Discuss how each of the following factors would most likely affect the prepayment risk of the mortgage-backed pass through securities:

(i) Coupon rate of the mortgage. (2 marks)

(ii) Age of the mortgage. (2 marks)

(iii) Seasonality. (2 marks)

(c) A passive manager purchases a position worth Sh.50 million in underlying value of a commodities futures contract. The manager also buys Sh.50 million worth of 10-year Treasury bonds that pay an interest rate of 5% per annum. After the end of one month, the commodities futures contract position has appreciated by 2% and the price of the 10-year Treasury bond is unchanged.

Required:
The gain in the value of the position. (2 marks)

(d) An investor owns two 30-year original maturity mortgage-backed securities (MBS), MBS-A and MBS-B. He uses the 10-year Treasury yield as a relative measure to gauge the level of current 30-year home mortgage rates. Over the past four years, the 10-year Treasury yield has declined below 5.50% three times, subsequently rising above 6.50% each time. The 10-year Treasury yield is currently at 6.50%.

The following information relates to the two mortgage-backed securities:

Issue	Coupon (%)	Weighted average maturity (months)	Price (Sh.)	Current month PSA	Current month CPR
MBS-A	7.50	355	100	500	5
MBS-B	7.50	260	100	200	12

Note:
- PSA is the prepayment scale developed by Public Securities Association (PSA) for analysing mortgage-backed securities.
- CPR is the conditional prepayment rate, a loan prepayment rate equal to the proportion of the principal of a pool of loans assumed to be paid off prematurity in each period.

Required:
(i) Explain the difference in the prepayment sensitivity of the two securities assuming a future decline in the 10-year Treasury yield of slightly more than 100 basis points. (4 marks)

(ii) Determine, with reasons, the security that would realise a higher percentage of principal prepayment, based on the current month PSA and CPR prepayment data. (2 marks)

(iii) Describe two reasons why prepayments are likely to be more stable for automobile receivable asset-backed securities when compared to similar duration mortgage-backed securities. (2 marks)

(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of Payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

KASNEB

CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

THURSDAY: 26 May 2016. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) Hedge funds were highly proficient at attracting capital prior to the world financial crises that began in 2007. However, in the recent past, hedge funds have increasingly competed with private equity firms in the purchase of corporate assets in the search for attractive opportunities in which to invest capital.

Required:
With respect to the above statement, evaluate five major differences between typical hedge fund incentive fees and typical private equity fund incentive fees. (5 marks)

(b) Mezzanine debt can be viewed as filling either a gap in a company's financial structure or a gap in the supply of capital in the financial markets. This makes mezzanine financing extremely flexible.

Required:
In the context of the above statement, explain five characteristics of mezzanine debt that help to distinguish it from the other sources of financing and other types of investments. (5 marks)

(c) An investment management firm is considering the following three investments in real estate:

1. Direct investment in an existing office building.
2. Investment in a public equity real estate investment trust (REIT).
3. Equity investment in a public real estate operating company (REOC).

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The data relating to the investment is presented below:

Option 1: Direct investment in an office building

Expected net operating income: Years 1-7	Sh.7.0 million
Expected net operating income: Year 8	Sh.8.5 million
Required return on equity investment	10%.
Net operating income growth rate after 8 years	3.25%.

Option 2: Real estate investment trust (REIT)

Recent net operating income	Sh.140 million
Non cash rents	Sh.5 million
Full year adjustments for acquisition	Sh.5 million
Other assets	Sh.50 million
Total liabilities	Sh.300 million
Current market price per share	Sh.125
Shares outstanding	15 million
Going in cap rate	7.00%
Net operating income growth rate	2.50%

Option 3: Real estate operating company (REOC)

Expected adjusted funds from operations (AFFO) in year 8	Sh.13.5 million
Holding period	7 years
Present value of all dividends for 7 years	Sh.39.7 million
Shares outstanding	1.0 million
Cap rate	7.0%
Growth rate from year 8	2.50%

Additional information:

1. The office building under consideration has existing tenants with long term leases that will expire in seven years.
2. The real estate operating company (REOC) terminal value at the end of seven years is to be based on a price to adjusted funds from operations (AFFO) multiple of 12 times (12x).

Required:

(i) The estimated value of the office building using the discounted cash flow approach. (4 marks)

(ii) Determine whether the real estate investment trust (REIT) is fairly priced using the net asset value (NAV) approach. (3 marks)

(iii) Calculate the estimated value per share of the real estate operating company (REOC). (3 marks)

(Total: 20 marks)

QUESTION TWO

(a) Discuss the following equity hedge fund strategies:

(i) Market neutral strategy. (1 mark)

(ii) Sector specific strategy. (1 mark)

(iii) Fundamental growth strategy. (1 mark)

(iv) Quantitative directional strategy. (1 mark)

(v) Short bias strategy. (1 mark)

(b) Representativeness is the key aspect of hedge fund databases and indices. The representativeness of a sample is the extent to which the characteristics of that sample are similar to the characteristics of the universe. If the sample consistently favours inclusion of observations based on a particular characteristic, then the sample is biased in favour of that characteristic.

Required:

Based on the aforementioned statement, assess the following data biases associated with hedge fund databases.

(i) Survivorship bias. (1 mark)

(ii) Selection bias. (1 mark)

(iii) Instant history bias/backfill bias. (1 mark)

(iv) Liquidation bias. (1 mark)

(c) Ukulima University endowment fund makes an investment in a venture capital fund known as Beta Fund with a vintage year of 2013 and committed capital of Sh.195 million. The distribution waterfalls calls for a 20% carried interest when the net asset value (NAV) before distributions exceeds the committed capital.

The performance of Sh.195 million of the venture Beta Fund capital is shown below:

Year	Called down Sh. "million"	Management fees Sh. "million"	Operating results Sh. "million"
2013	30	0.45	-10
2014	25	0.83	55
2015	75	1.95	75

Required:

(i) Calculate the year 2015 percentage management fee of the Beta Fund. (3 marks)

(ii) Determine the net asset value (NAV) of the fund after distributions for the year 2015. (4 marks)

(d) Stephen Ayabi, a private equity fund analyst is evaluating fund A and fund B whose information is provided below:

	Fund A	Fund B
Gross internal rate of return (IRR)	22.1%	2.4%
Net internal rate of return (IRR)	17.6%	-0.3%
Performance quantile	1	3
Distributed to paid in capital (DPI)	1.43	0.29
Residual value to paid in capital (RVPI)	1.52	1.03
Total value to paid in capital (TVPI)	2.95	1.32
Maturity of fund	6 years	4 years

Required:
Compare the financial performance of private equity fund A and fund B. (4 marks)
(Total: 20 marks)

QUESTION THREE

(a) Explain three ways of categorising infrastructure investment as an alternative asset. (3 marks)

(b) Commodities are often viewed as an asset class that is distinct from shares and bonds (financial assets) in several regards.

Required:
In relation to the above statement, discuss three reasons that might make commodity prices not to have high positive correlation with share prices and bond prices. (3 marks)

(c) Highlight two disadvantages of investing in each of the following private real estate investment vehicles:

(i) Private equity real estate funds. (2 marks)

(ii) Commingled real estate funds (CREFs). (2 marks)

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(d) Oduor Okoth is considering an investment in a two-sequential pay tranche collateralised mortgage obligation (CMO) and would like to understand how the cash flows are paid. Principal payments are made first to the highest seniority tranche, Tranche A, and next to the lower seniority tranche, Tranche B.

The CMO structure is as follows:

Tranche	Outstanding par value Sh. "million"	Coupon rate %
A	200	7
B	100	7

The total principal prepayments, both scheduled and unscheduled, are Sh.456,350 in month 1.

Required:
Calculate the cash flow allocation in Month 1. (6 marks)

(e) (i) A speculator trades crude oil when the spot price is 40 United States dollars (USD) while the expiring futures contract is priced at 42 USD. Sometime later, a new futures contract is priced at 45 USD while crude oil is currently priced at 42.80 USD.

Required:
The roll yield. (2 marks)

(ii) An asset is priced at Sh.90. A futures contract on the asset expires in 75 days. The risk free interest rate is 7%. The underlying asset's storage cost at the futures expiration is equal to Sh.3.00 and the compound value at the time of the futures expiration of the positive cash flows from the underlying asset is Sh.0.50.

Required:
The appropriate futures price. (2 marks)
(Total: 20 marks)

QUESTION FOUR

(a) (i) Analyse three risk factors associated with real estate investment. (3 marks)

(ii) Evaluate three disadvantages of investing in real estate through publicly traded securities. (3 marks)

(b) Jabavu Investments Services (JIS) operates as a hedge fund with an initial capital of Sh.350 billion. JIS charges a 3.2 per cent management fee based on assets under management at the end of the year. JIS also charges a 32 per cent incentive fee based on returns which are beyond a 10.2 per cent hurdle rate. In its first year, JIS hedge fund appreciates by 17.2 per cent. JIS calculates its management fees using end-of-period valuation.

Required:
The investors net return.
(Assume that the performance fee is calculated net of management fee). (4 marks)

(c) The table below shows monthly returns for a hedge fund and an index portfolio. The hurdle rate is the 91-day Treasury Bill rate, assumed to be 10% per annum.

Month	January	February	March	April	May	June	July	August	September	October	November	December
Hedge fund return (%)	7.1	8.1	-4.1	-4.1	-2.1	1.9	-2.1	3.5	5.5	7.5	0.9	-6.5
Index return (%)	-4.9	-8.1	-3.3	6.1	-8.5	4.1	5.1	-4.3	-4.1	1.1	6.2	0.5

The calculated annualised standard deviations for the hedge fund and the index are 16.84% and 17.87% respectively.

Required:

(i) The annualised downside deviations for the hedge fund and the index. (3 marks)

(ii) Contrast the results obtained in (c)(i) above with the calculated annualised standard deviations above. (1 mark)

(iii) The Sortino ratio for the hedge fund and the index. (5 marks)

(iv) Comment on the performance of the hedge fund against the performance of the index portfolio based on the result obtained in (c)(iii) above. (1 mark)

(Total: 20 marks)

QUESTION FIVE

(a) (i) Explain the term separately managed accounts (SMAs) in relation to alternative investments. (1 mark)

(ii) Evaluate four ways in which separately managed accounts differ from a fund. (4 marks)

(b) Describe four categories of outside service providers as major participants in the world of alternative investments. (4 marks)

(c) An asset backed security (ABS) structure has the following data:

Senior tranche	Sh.150 million.
Subordinated tranche A	Sh.60 million.
Subordinated tranche B	Sh.20 million.

The assets in the pool are worth Sh.250 million

Required:
Determine the amount of losses at which the senior tranche investors would begin to lose money. (3 marks)

(d) The following data relates to selected mortgage backed securities (MBSs):

MBS	Initial principal Sh. "millions"	Coupon rate (%)	Underlying maturity (years)	Nominal spread (%)	Option adjusted spread (%)	Z-spread (%)
W	250	7.0	30	1.21	0.28	0.79
X	175	7.8	25	1.43	0.49	1.16
Y	225	7.2	20	1.62	0.31	1.12
Z	190	8.0	30	1.59	0.40	1.14

The outstanding principal of MBS-Z is Sh.183 million at the beginning of month 20 and the total mortgage principal payment for the month is Sh.0.42 million.

Required:

(i) Calculate the expected prepayment for month 20 using 125 public securities association (PSA). (2 marks)

(ii) Justify the MBS that would add the most relative value in relation to the risk associated with the security, assuming the effective durations of the MBS securities is approximately the same. (2 marks)

(e) A cash funded collateralised debt obligation (CDO) has a reference pool of assets that consists of 50 loans. The notional amount of each loan is Sh.5 million. The mezzanine tranche for this CDO has a notional value of Sh.20 million, and the spread is 90 basis points. The loss given default is 60%. The mezzanine tranche has a lower attachment point of 2% and a tranche width of 3%.

Required:

The loss for the mezzanine tranche if six defaults occur. (4 marks)

(Total: 20 marks)

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Present Value of 1 Received at the End of n Periods:

$$PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	9615	.9524	.9434	.9346	9259	.9174	9091	.8929	8772	8696	8621	8475	.8333	.8065	.7813	7576	7353
2	.9803	.9612	.9426	.9246	.9070	.8900	8734	.8573	.8417	.8264	.7972	7695	7561	7432	.7182	.6944	.6504	.6104	5739	5407
3	.9706	.9423	.9151	.8890	.8638	.8396	8163	.7938	.7722	.7513	.7118	6750	.6575	.6407	.6086	.5787	.5245	.4768	4348	3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	7084	.6830	6355	5921	5718	.5523	.5158	.4823	.4230	.3725	3294	2923
5	9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	5194	4972	.4761	.4371	.4019	.3411	2910	2495	.2149
6	9420	.8880	.8375	.7903	.7462	.7050	.6663	6302	.5963	.5645	.5066	.4556	.4323	.4104	3704	.3349	.2751	.2274	1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	4039	.3506	3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	3075	.2843	.2630	.2255	.1938	.1443	.1084	0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	2472	.2267	.1911	.1615	1164	.0847	.0623	0462
11	8963	.8043	7224	.6496	.5847	.5268	.4751	.4289	3875	.3505	2875	.2366	.2149	1954	.1619	.1346	.0938	.0662	.0472	0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	1685	1372	.1122	.0757	.0517	0357	.0250
13	.8787	7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	1625	.1452	.1163	.0935	.0610	0404	0271	0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	1597	.1413	.1252	.0985	.0779	.0492	.0316	0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	3152	.2745	.2394	.1827	1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	1069	.0930	.0708	.0541	.0320	.0193	.0118	0073
17	8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	0054
18	8360	.7002	.5874	.4936	.4155	.3503	.2959	2502	.2120	.1799	.1300	.0946	0808	0691	.0508	.0376	.0208	.0118	.0068	0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	2317	1945	.1635	.1161	0829	0703	.0596	.0431	.0313	.0168	.0092	.0051	0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	2145	1784	1486	1037	0728	.0611	.0514	.0365	0261	.0135	.0072	.0039	.0021
25	7798	.6095	.4776	.3751	.2953	.2330	.1842	1460	.1160	.0923	.0588	0378	.0304	0245	0160	0105	.0046	.0021	.0010	0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	0994	.0754	.0573	0334	0196	0151	.0116	0070	.0042	.0016	0006	.0002	0001
40	.6717	.4529	3066	.2083	.1420	.0972	.0668	0460	.0318	0221	.0107	.0053	0037	.0026	0013	.0007	.0002	.0001		
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	0134	.0085	.0035	0014	0009	.0006	0003	.0001				
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	0057	.0033	.0011	.0004	.0002	.0001						

* The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{r,n} = \sum_{t=1}^{n} \frac{1}{(1+r)^t} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Number of Payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333	0.8065	0.7813	0.7576
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6467	1.6257	1.6052	1.5656	1.5278	1.4568	1.3916	1.3315
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.3216	2.2832	2.2459	2.1743	2.1065	1.9813	1.8684	1.7663
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.9137	2.8550	2.7982	2.6901	2.5887	2.4043	2.2410	2.0957
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.4331	3.3522	3.2743	3.1272	2.9906	2.7454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	3.4976	3.3255	3.0205	2.7594	2.5342
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.2883	4.1604	4.0386	3.8115	3.6046	3.2423	2.9370	2.6775
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.6389	4.4873	4.3436	4.0776	3.8372	3.4212	3.0758	2.7860
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.9464	4.7716	4.6065	4.3030	4.0310	3.5655	3.1842	2.8681
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.2161	5.0188	4.8332	4.4941	4.1925	3.6819	3.2689	2.9304
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.4527	5.2337	5.0286	4.6560	4.3271	3.7757	3.3351	2.9776
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603	5.4206	5.1971	4.7932	4.4392	3.8514	3.3868	3.0133
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	6.2651	5.9542	5.6685	5.1624	4.7296	4.0333	3.5026	3.0882
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.3729	6.0472	5.7487	5.2223	4.7746	4.0591	3.5177	3.0971
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.4674	6.1280	5.8178	5.2732	4.8122	4.0799	3.5294	3.1039
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162	4.8435	4.0967	3.5386	3.1090
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3.1129
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.8729	6.4641	6.0971	5.4669	4.9476	4.1474	3.5640	3.1220
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	7.0027	6.5660	6.1772	5.5168	4.9789	4.1601	3.5693	3.1242
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	7.1050	6.6418	6.2335	5.5482	4.9966	4.1659	3.5712	3.1250
50	39.1961	31.4236	25.7298	21.4822	18.2559	15.7619	13.8007	12.2335	10.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541	4.9995	4.1666	3.5714	3.1250
60	44.9550	34.7609	27.6756	22.6235	18.9293	16.1614	14.0392	12.3766	11.0480	9.9672	8.3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3.1250

KASNEB

CIFA PART III SECTION 5

ALTERNATIVE INVESTMENTS ANALYSIS

PILOT PAPER

September 2015. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

QUESTION ONE

(a) Consider the following asset backed security (ABS) structure:

Tranche	Sh.
Senior tranche	200,000,000
Subordinate tranche A	150,000,000
Subordinate tranche B	70,000,000
Total	420,000,000

If the assets in the pool are worth Sh.450,000,000, what is the amount of collateralisation and at what amount of losses will the senior tranche investors begin to lose money? (2 marks)

(b) In the context of mortgage backed securities (MBS), explain five factors that affect prepayments and the types of prepayment risks. (10 marks)

(c) An appraiser has been asked to estimate the value of a warehouse. He has collected the following information:

		Comparable Transactions		
Unit of comparison	**Subject property**	**1**	**2**	**3**
Size in square feet	30,000	40,000	20,000	35,000
Age in years	5	9	4	5
Physical condition	Average	Good	Average	Poor
Location	Prime	Prime	Secondary	Prime
Sale date months ago		6	18	12
Sale price		9,000,000	4,500,000	8,000,000

Each adjustment is based on the unadjusted sales price of the comparable. Properties depreciate at 2% per annum.

Additional information:

1. Since comparable No.1 is four years older than the subject, an upward adjustment of Sh.720,000 is made [Sh.9,000,000 x 2% x 4 years].
2. Condition adjustment: Good: +5%, average: none; poor:-5%. Because comparable No. 1 is in better condition than the subject, a downward adjustment of Sh.450,000 is made [Sh.9,000,000 x 5%]. Similarly, an upward adjustment of Sh.450,000 is made [Sh.9,000,000 x 5%]. Similarly, an upward adjustment is made for comparable No.3 to the tune of Sh.400,000 [Sh.8,000,000 x 5%].
3. Location adjustment: Prime - none, Secondary - 10%. Because both comparable No.1 and the subject are in a prime location, no adjustment is made.
4. Over the past 24 months, sales prices have been appreciating at 0.5% per month. Because comparable No.1 was sold six months ago, an upward adjustment of Sh.270,000 is made [Sh.9,000,000 x 0.5% x 6 months].

Compute the value of the subject property using the sales comparison approach. (8 marks)

(Total: 20 marks)

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QUESTION TWO

(a) Explain four alternative exit strategies in private equity and their impact on value. (8 marks)

(b) Two private equity funds, fund X and fund Y, are being considered by an investor. Financial performance of private equity fund X and fund Y is shown below:

	Fund X	Fund Y
Gross IRR	22.1%	2.4%
Net IRR	17.6%	-0.3%
Performance quartile	1	3
DPI (Distributed to paid-in capital)	1.43	0.29
RVPI (Residual value to paid-in capital)	1.52	1.03
TVPI (Total value to paid-in capital)	2.95	1.32
Maturity of fund	6 years	4 years

Required:

(i) Interpret and compare the financial performance of private equity funds X and Y. (5 marks)

(ii) Describe motivations for hedge fund replication strategies. (6 marks)

(iii) Distinguish between alternative investments and traditional investments. (1 mark)

(Total: 20 marks)

QUESTION THREE

(a) Jenga Ltd.'s bonds have a duration of 5.6 years and a convexity of 38.2. Tengeneza Ltd.'s bonds have a duration of 7.3 years and a convexity of 38.2.

Required:

Determine which bond is exposed to more interest rate risk when the interest rate increases by 100 basis points. (2 marks)

(b) A company is valued at Sh.10,000,000 prior to a capital infusion of Sh.4,000,000 by a venture capital investor.

Required:

The post-money valuation and the venture capital investor's proportional ownership. (4 marks)

(c) Kumiko fund is a hedge fund with a value of Sh.100 million at the beginning of the year (an all-time high). Kumiko funds charges 2% management fee based on assets under management at the beginning of the year and a 20% incentive fee with a 5% hard hurdle rate and uses a high water mark. Incentive fees are calculated on gains net of management fees. The ending values before fees are:

Year 1: Sh.125.75 million.
Year 2: Sh.127.40 million.
Year 3: Sh.138.44 million.

Required:

The total fees and investor's net return for all three years. (14 marks)

(Total: 20 marks)

QUESTION FOUR

(a) Describe the three broad strategies applicable to hedge funds. (15 marks)

(b) Explain the following terms as used in commodities:

(i) Contango. (1 mark)

(ii) Back Wardation. (1 mark)

(iii) Collateral yield. (1 mark)

(iv) Price return. (1 mark)

(v) Roll yield. (1 mark)

(Total: 20 marks)

QUESTION FIVE

(a) James Adanje, a quantitative analyst dealing with commodities investments for Alpha investment recently returned from a seminar. In that seminar, Jack Baker, a well publicised quantitative analyst at national brokerage firm, discussed one of his new models in great detail, and Adanje was intrigued by the new concepts. He proceeds to test this model making some minor changes but retaining the overall concept, until he produces some very positive results. Adanje quickly announces to his supervisors at Alpha Investment that he has discovered a new model and that clients and prospective clients alike should be informed of this positive finding as ongoing proof of Alpha's continuing innovation and ability to add value.

Required:
Explain whether Adanje has violated any ethical principles applicable in the investment and financial analysis profession. (5 marks)

(b) Assume the current spot price is Sh.1500 per bag of wheat and the effective monthly interest rate is 1%. The monthly storage costs for wheat is Sh.40 per bag.

Calculate the 3-month forward price for a bag of wheat. (7 marks)

(c) A real estate lender agreed to make a 10% interest-only loan on a property that had just been appraised for Sh.1,200,000 as long as the debt service coverage ratio is at least 1.5 and the loan-to-value ratio does not exceed 80%.

Required:
The maximum loan amount assuming the property's net operating income (NOI) is Sh.135,000. (5 marks)

(d) Distinguish between traditional investing and hedge fund investing. (3 marks)

(Total: 20 marks)

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