CERTIFIED INVESTMENT AND FINANCIAL ANALYSTS (CIFA)

POST ADVANCED LEVEL

FINANCIAL MODELLING AND DATA ANALYTICS (PRACTICAL PAPER)

THURSDAY: 4 December 2025. Morning Paper. **Time Allowed: 3 hours.**

This paper consists of three (3) sections. SECTION I has twenty (20) Multiple Choice Questions each carrying one (1) mark. SECTION II has two (2) practical questions each carrying thirty (30) marks. SECTION III has two (2) practical questions each carrying twenty (20) marks. Answer ALL questions in SECTION I and SECTION II and any ONE question in SECTION III.

Under SECTION II and SECTION III, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions. You may use the Excel template within the question.

SECTION I (20 MARKS)

Answer ALL questions in this section.

1. You possess a large dataset of daily stock prices in Ms Excel. To rapidly find stocks with both a price-to-earnings (P/E) ratio lower than 15 and a price-to-book (P/B) ratio lower than 2, the bests Ms Excel feature to use is _____.
   A. a Pivot Table
   B. the FILTER function
   C. conditional formatting with a custom formula
   D. the COUNTIFS function (1 mark)

2. Which one of the following Ms Excel features is **MOST** appropriate for developing a dynamic dashboard presenting financial key performance indicators (KPIs) that incorporate drill-down function?
   A. VLOOKUP with conditional formatting
   B. Pivot Tables with slicers
   C. Goal Seek
   D. Solver with Constraints (1 mark)

3. Volatility, skewness, kurtosis and Sharpe ratios (features) of 150 unclassified hedge funds are available in a dataset. The goal is to empirically determine the strategy of each fund using the four features. Which one of the following types of learning is **BEST** suited for this problem?
   A. Supervised learning
   B. Unsupervised learning
   C. Semi-supervised learning
   D. Reinforcement learning (1 mark)

4. One hundred monthly returns of a local bank are regressed on monthly returns of the NASI Index. These estimates are obtained: slope = 1.4 with standard error of 0.49 and intercept = 0.2 with standard error of 0.065. What is the t-statistic for the slope?
   A. 2.09
   B. 0.28
   C. 2.86
   D. 3.21 (1 mark)

5. Which one of the following models could be used to study the characteristics of customers who are likely to churn, that is when customers indicate cancel a subscription, stop purchasing or switch to a competitor?
   A. A hybrid model
   B. A descriptive model
   C. A predictive model
   D. A prescriptive model (1 mark)

6. Which one of the following statements is the **MOST** likely reason for using a decision tree in financial modelling and data analytics?
   A. To perform linear regression
   B. To classify data into distinct categories
   C. To reduce the dimensionality of the dataset
   D. To generate synthetic data (1 mark)

7. Which one of the following Ms Excel formulae is used to determine how much an investor should pay per Sh.100 for a single principal cash flow payable in 20 years on a government bond issued when the yield to maturity (YTM) is 6.70%?
   A. FV(rate,nper,pmt,[pv],[type])
   B. YIELD(settlement, maturity, rate, pv, redemption, frequency, [basis])
   C. RATE(nper, pmt, pv, [fv], [type], [guess])
   D. PV(rate, nper, pmt, [fv], [type]) (1 mark)

8. Assuming all other factors remain constant, as the correlation between two assets moves closer to –1.0, the diversification benefits _____.
   A. double
   B. increase
   C. stay the same
   D. decrease (1 mark)

9. Which one of the following statements represents the **BEST** practice for distinguishing between "input" and "formula" cells in financial modeling?
   A. Input cells use blue font while formula cells use black font
   B. Input cells should be in black font and formula cells should be in blue font
   C. For input cells, use an unbolded black font and for formula cells, use a bolded black font
   D. Input cells have a bolded black font, while formula cells have an unbolded black font (1 mark)

10. Which one of the following is the **CORRECT** formula for determining the cash conversion cycle?
   A. Days payable outstanding + Days sales outstanding – Days of inventory on hand
   B. Days sales outstanding + Days of inventory on hand – Days payable outstanding
   C. Days of inventory on hand – Days sales outstanding – Days payable outstanding
   D. Days of inventory on hand + Days payable outstanding – Days sales outstanding (1 mark)

11. Which one of the following shortcut keys in Ms Excel is used to create an absolute cell reference?
    A. F4
    B. F10
    C. F11
    D. F12 (1 mark)

12. Which one of the following statements outlines the **MAIN** challenge of dealing with the "Variety" of Big Data?
    A. Integrating and standardising data
    B. Storing the data
    C. Analysing the data in real time
    D. Ensuring the quality and reliability of the data (1 mark)

13. In data visualisation, which one of the following is the **LEAST** likely to be used for representing hierarchical data?
    A. Bar chart
    B. Tree map
    C. Sunburst chart
    D. Dendrogram (1 mark)

14. A company makes an initial investment of Sh.5,000,000 (cell B2) and anticipates annual cash inflows of Sh.1,200,000, Sh.1,500,000, Sh.2,000,000, Sh.2,200,000, and Sh.2,500,000 in cells C2:C6. If the discount rate is 10% (cell B1), which one of the following formulas **CORRECTLY** calculates the Net Present Value (NPV) in Ms Excel?
    A. =NPV(B1,C2:C6)-B2
    B. =NPV(B1,B2:C6)
    C. =NPV(B1,C2:C6)+B2
    D. =NPV(B1,C2:C6) (1 mark)

15. A project cash flow model requires conducting sensitivity analysis on both sales growth and the discount rate at the same time. Which one of the following Ms Excel tools would be the **MOST** efficient to use?
    A. One-way data table
    B. Two-way data table
    C. Goal Seek
    D. Filter (1 mark)

16. Which one of the following is **MOST** important for obtaining a valid result when calculating the Internal Rate of Return (IRR) in Ms Excel using the =IRR function?
    A. All cash flows must be positive
    B. Cash flows must include at least one negative and one positive value
    C. The discount rate must be fixed at 10%
    D. Cash flows must be evenly spaced monthly (1 mark)

17. The primary reason for using named ranges instead of cell references in financial models is to _____.
    A. reduce file size
    B. improve readability and minimise formula errors
    C. increase calculation speed
    D. prevent accidental edits (1 mark)

18. Which one of the following statements **BEST** describes when a dual-axis chart in Ms Excel is **MOST** useful?
    A. When comparing two data series with different scales
    B. When summarising categorical data
    C. When displaying cumulative contributions
    D. When showing only positive values in a dataset (1 mark)

19. Which one of the following **BEST** describes the main purpose of extract, transform and load (ETL) processes?
    A. To visualise data from multiple sources
    B. To store raw data in flat files
    C. To clean, integrate and prepare data for analysis
    D. To convert unstructured data into charts (1 mark)

20. Which one of the following **BEST** illustrates an ethical issue in data analytics?
    A. Using large datasets to improve model accuracy
    B. Sharing personally identifiable information (PII) without consent
    C. Cleaning data to remove duplicates and errors
    D. Applying machine learning algorithms to predict trends (1 mark)

CIFA POST ADVANCED LEVEL

FINANCIAL MODELLING AND DATA ANALYTICS (PRACTICAL PAPER)

FRIDAY: 25 April 2025. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions in SECTION I and SECTION II and any ONE question in SECTION III. SECTION I has twenty (20) Multiple Choice Questions each carrying one (1) mark. SECTION II has two practical questions each carrying thirty (30) marks. SECTION III has two practical questions each carrying twenty (20) marks.

Under SECTION II and SECTION III, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions. You may use the Excel template within the question.

SECTION I (20 MARKS)

Answer ALL questions in this section.

1. In financial modelling, the Weighted Average Cost of Capital (WACC) is primarily used to _____.
   A. calculate the return on equity
   B. determine the cost of capital for the firm
   C. evaluate operational efficiency
   D. forecast revenue growth (1 mark)

ANSWER: B

2. In Ms Excel, the function PMT calculates the _____.
   A. present value of a series of payments
   B. future value of an annuity
   C. equal payment for a loan
   D. net present value of cash flows (1 mark)

ANSWER: C

3. In capital budgeting model, which one of the following is used to account for risk and certainty in project valuation?
   A. Sensitivity analysis
   B. Operating leverage
   C. Fixed costs
   D. Cash flow projections (1 mark)

ANSWER: A

4. Which one of the following charts in Ms Excel is **MOST** effective for displaying the relationship between two numerical variables?
   A. Line chart
   B. Bar chart
   C. Scatter plot
   D. Pie chart (1 mark)

ANSWER: C

5. The following are parts of a conceptual data model in data analytics, **EXCEPT** _____.
   A. entity-relationship diagram
   B. high-level description of data relationships
   C. definition of key performance indicators
   D. detailed schema for physical data storage (1 mark)

ANSWER: D

6. Which one of the following data mining algorithms is used for classification of tasks in business analytics?
   A. K-means clustering
   B. Decision trees
   C. Principal component analysis (PCA)
   D. Linear regression (1 mark)

ANSWER: C

7. Tableau is commonly used in data analytics for _____.
   A. developing complex algorithms
   B. cleaning and transforming raw data
   C. creating dynamic and interactive visualisation
   D. predicting future market movements (1 mark)

ANSWER: C

8. In data analysis, outliers are important because they _____.
   A. represent normal variations in the data
   B. indicate potential data errors or anomalies
   C. help improve the accuracy of regression models
   D. provide insights into future trends (1 mark)

ANSWER: B

9. What is the primary benefit of using a "leveraged buyout" (LBO) model in financial analysis?
   A. To evaluate potential acquisitions and their impact on the company's financials
   B. To assess the financial health of a target company
   C. To forecast stock market trends
   D. To understand the impact of leverage on equity returns for investors (1 mark)

ANSWER: D

10. Which one of the following techniques is primarily used to analyse a company's capital structure and its effect on financial risk?
   A. Sensitivity analysis
   B. Scenario analysis
   C. Monte Carlo simulation
   D. Leverage analysis (1 mark)

ANSWER: D

11. Which one of the following statements explains the purpose of a discount rate in a financial model?
   A. To estimate the risk-free interest rate in a market
   B. To determine the present value of future cash flows
   C. To calculate the tax implications of a business acquisition
   D. To apply a premium to future earnings estimates (1 mark)

ANSWER: B

12. Which one the following Ms Excel functions would be used to calculate the price of a bond with semi-annual coupons given the coupon rate, face value, YTM and maturity?

A. = PRICE (settlement, maturity, rate, yield, redemption, frequency, [basis])
B. = BONDPRICE (settlement, maturity, rate, yield, face value, payment, frequency)
C. = PV (rate, nper, pmt, [fv], [type])
D. = DURATION (settlement, maturity, rate, yield, frequency, [basis]) (1 mark)

ANSWER: A

13. In financial modelling, what does the term "haircut" refer to?

A. A discount applied to the estimated future earnings of a company
B. A reduction in the value of an asset used as collateral for a loan
C. The percentage of capital gains subject to taxation
D. An adjustment made to historical data in forecasting (1 mark)

ANSWER: B

14. Which one of the following techniques is **MOST** commonly used to value an early-stage start-up with little to no revenue?

A. Discounted cash flow (DCF)
B. Precedent transactions
C. Venture capital method
D. Dividend discount model (DDM) (1 mark)

ANSWER: C

15. Which one of the following Ms Excel functions calculates the Net Present Value (NPV) of cash flows with changing discount rates over different years?

A. = NPV (rate, value1, [value2], ...)
B. = XNPV (rate, values, dates)
C. = NPV(SUM(rate1:rate5), cashflows)
D. = IRR (values, [guess])

(1 mark)

ANSWER: B

16. Which one of the following types of graphs is **BEST** suited to visualise the distribution of a continuous numerical variable?

A. Pie chart
B. Histogram
C. Line graph
D. Scatter plot (1 mark)

ANSWER: B

17. Which one of the following terms refers to a key concept in Big Data that deals with the variety, volume and velocity of data generated by digital systems?

A. Predictive analytics
B. Data mining
C. Data warehousing
D. 5Vs of Big Data (1 mark)

ANSWER: D

18. Which one of the following Ms Excel functions is used to calculate the duration of a bond, considering the yield to maturity and payment frequency?

A. = DURATION (settlement, maturity, rate, yield, frequency, [basis])
B. = YIELD (settlement, maturity, rate, price, redemption, frequency, [basis])
C. = PRICE (settlement, maturity, rate, yield, redemption, frequency, [basis])
D. = MDURATION (settlement, maturity, rate, yield, frequency, [basis]) (1 mark)

ANSWER: A

19. Which one of the following features is used in Ms Excel to create summary reports and cross-tabulations?
A. PivotTables
B. Data Tables
C. Database function
D. Solver (1 mark)

ANSWER: A

20. Which one of the following Ms Excel functions can be used to calculate the future value of an investment, where you have a fixed growth rate and periodic payments?
A. = FV(rate, nper, pmt, [pv], [type])
B. = PV(rate, nper, pmt, [fv], [type])
C. = CUMIPMT(rate, nper, pv, start_period, end_period, type)
D. = IPMT(rate, per, nper, pv) (1 mark)

ANSWER: A

CIFA POST ADVANCED LEVEL

FINANCIAL MODELLING AND DATA ANALYTICS (PRACTICAL PAPER)

FRIDAY: 26 April 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions in SECTION I and SECTION II and ONE question in SECTION III. SECTION I has twenty (20) Multiple Choice Questions each carrying one (1) mark. SECTION II has two practical questions each carrying thirty (30) marks. SECTION III has two practical questions each carrying twenty (20) marks.

Under SECTION II, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions. You may use the Excel template within the question.

SECTION I (20 MARKS)

Answer ALL questions in this section.

1. What is the purpose of sensitivity analysis in financial modelling?
   A. To assess the model's historical accuracy
   B. To identify and quantify the impact of changes in key assumptions on model outputs
   C. To calculate the Internal Rate of Return (IRR)
   D. To measure the financial leverage of a company

   ANSWER: B

2. When using the Black-Scholes Model for option pricing, which of the following factors has the **MOST** significant impact on the option's value?
   A. Strike price
   B. Time to expiration
   C. Implied volatility
   D. Risk-free interest rate

   ANSWER: C

3. What is the primary objective in a Monte Carlo simulation?
   A. To predict future stock prices
   B. To estimate the probability distribution of possible outcomes
   C. To calculate the Net Present Value (NPV) of a project
   D. To determine the accounting break-even point

   ANSWER: B

4. What is the **MAIN** difference between simple linear regression and multiple linear regression in financial modelling?
   A. Simple linear regression has only one independent variable, while multiple linear regression can have multiple independent variables
   B. Simple linear regression is used for time series data, while multiple linear regression is used for cross-sectional data
   C. Simple linear regression is more accurate than multiple linear regression
   D. Multiple linear regression is used for predicting binary outcomes

   ANSWER: A

5. When using the XNPV () function in Spreadsheet application, what key difference does it have compared to the regular NPV () function?
   A. It accounts for irregularly spaced cash flows
   B. It discounts cash flows at a fixed rate
   C. It considers inflation in the discount rate
   D. It excludes initial cash flows

   ANSWER: A

6. Which Spreadsheet application tool is commonly used to perform scenario analysis by changing multiple input variables in a financial model?
   A. Data validation
   B. Goal seek
   C. Solver
   D. Scenario manager

   ANSWER: C

7. When modelling a complex merger or acquisition deal, what Spreadsheet application feature allows you to consolidate data from multiple worksheets into one master sheet?
   A. Pivot Tables
   B. Power Query
   C. Excel Tables
   D. Conditional Formatting

   ANSWER: B

8. When constructing a Monte Carlo simulation in Spreadsheet application, which function is commonly used to generate random numbers within a specified range?
   A. RAND()
   B. RANDBETWEEN()
   C. RANDOM()
   D. RANDOMIZE()

   ANSWER: B

9. In a Spreadsheet, what does the function INDEX() do in the context of financial modelling?
   A. Retrieves the current stock price from a web source
   B. Returns the value of a cell at a specific row and column
   C. Calculates the rate of return on an investment
   D. Performs complex statistical analysis

   ANSWER: B

10. When modelling complex financial structures such as structured finance deals, which Excel function is often used to create dynamic links to other workbooks and external data sources?
   A. HYPERLINK()
   B. GETPIVOTDATA()
   C. INDIRECT()
   D. PIVOTDATA( )

   ANSWER: C

11. In bond valuation, what does "matrix pricing" primarily involve?
   A. Using mathematical matrices to calculate bond prices
   B. Determining bond prices based on the relationship between coupon rates and market discount rates
   C. Pricing bonds using a grid of data points
   D. Evaluating bonds in the secondary market

   ANSWER: C

12. Which basic model is used for pricing and valuation of options contracts?
    A. Heuristic Model
    B. Option Pricing Model
    C. Euler's Numerical Model
    D. Binomial Option Pricing Model

ANSWER: D

13. The following are statistical functions, **EXCEPT**_____.
    A. VARP
    B. AND
    C. RAND
    D. SMALL

ANSWER: B

14. What is the shortcut to display the Format Cells menu?
    A. CTRL+ENTER
    B. CTRL+1
    C. CTRL+Z
    D. CTRL+ARROW

ANSWER: B

15. What function does a line plot perform?
    A. Show numbers that are independent of each other in a count bar
    B. Show the whole quantity divided into categories by the angle of the pie
    C. Show continuous variable change over other continuous scales, usually time
    D. Has two or three orthogonal axes to represent different continuous quantities on a different axis

ANSWER: C

16. Which of the following statements is **FALSE** about the uses of information functions in a Spreadsheet application?
    A. Writing comments within numerical formulae
    B. General error checking
    C. Providing other information about the content, position or format of a cell
    D. Allowing manipulation of numerical fields by first turning them into text

ANSWER: D

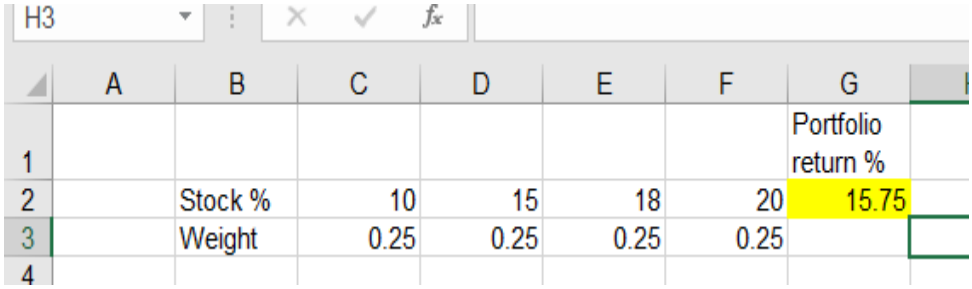
17. A characteristic of "Big Data" is that:
    A. It involves formats with diverse structures
    B. One of its traditional sources is business processes
    C. Real-time communication is uncommon due to the vast content
    D. Data solutions are optimised for performance and design applications

ANSWER: A

18. What is the **CORRECT** formula to determine the present value of a cash flow?
    A. Present Value= Cash Flow/$(1+Rate)^{time}$
    B. Present Value= Cash Flow*$(1+Rate)^{time}$
    C. Present Value= Cash Flow*$(1-Rate)^{time}$
    D. Present Value= Cash Flow/$(1+Rate)^{1/time}$

ANSWER: A

19. Which of the following is the **CORRECT** formula to calculate the portfolio return displayed on cell G2 below?



A. =SUMPRODUCT(C2:F2,C3:F3)
B. =AVERAGE(C2:F2,C3:F3)
C. =SUM(C2:F2,C3:F3)
D. =MEDIAN(C2:F2,C3:F3)

ANSWER: A

20. The following statements are correct about a Spreadsheet's Goal Seek, **EXCEPT** _____.
A. Goal Seek enables what-if analysis
B. Goal Seek can find a specific outcome of a formula by changing the value of a cell that is used as an input into that formula
C. If you know the outcome of a formula, but not the input value that will generate that outcome, you can use Spreadsheet's Goal Seek
D. Goal Seek may be varied in order to achieve some result for the output, and constraints may be imposed

ANSWER: D

CIFA POST ADVANCED LEVEL

FINANCIAL MODELLING AND DATA ANALYTICS (PRACTICAL PAPER)

FRIDAY: 8 December 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions in SECTION I and SECTION II and ONE question in SECTION III. SECTION I has twenty (20) Multiple Choice Questions each carrying one (1) mark. SECTION II has two practical questions each carrying thirty (30) marks. SECTION III has two practical questions each carrying twenty (20) marks.

Under SECTION II and III, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions.

SECTION I (20 MARKS)

Answer ALL questions in this section.

1. What formula should be entered in cell A3 to display the results as shown below?

	A	B	C	D	E	F	G
1	**KSH 000's**		**2018A**	**2019A**	**2020A**	**2021A**	**2022A**
2							
3	**Income Statement KSH 000's**						
4	**Revenue**		**150,000**	**165,000**	**181,500**	**199,650**	**219,615**
5	COGS		67,500	74,250	81,000	89,000	98,000
6	Gross Margin		**82,500**	**90,750**	**100,500**	**110,650**	**121,615**
7	SG&A		16,500	18,150	20,000	22,000	25,300
8	EBITDA		66,000	72,600	80,500	88,650	96,315
9	Depreciation		6,600	7,260	9,000	9,500	9,800
10	Interest		1,000	1,000	1,000	1,000	1,000
11	EBT		58,400	64,340	70,500	78,150	85,515
12	Taxes		17,500	19,300	20,100	23,600	26,600
13	**Net Income**		**40,900**	**45,040**	**50,400**	**54,550**	**58,915**
14							

A. ="Income Statement"&''A1
B. ="Income Statement "&A1
C. ="Income Statement "+A1
D. ="Income Statement "&"A1" (1 mark)

ANSWER: B

2. When modeling a company's working capital, which of the following is typically considered a current liability?
A. Accounts receivable
B. Inventory
C. Accounts payable
D. Property, plant and equipment (1 mark)

ANSWER: C

3. What is the primary role of SQL (Structured Query Language) in data analytics?
A. It is a data cleaning tool
B. It is a database management system
C. It is a reporting and visualisation tool
D. It is used for querying and manipulating relational databases (1 mark)

ANSWER: D

4. Assuming cell A1 is displaying the number "17000.7789". What formula should be used to round this number to the closest integer?

A. =MROUND(A1,100)
B. =MROUND(A1,10)
C. =ROUND(A1,0)
D. =ROUND(A1,1) (1 mark)

ANSWER: C

5. Which spreadsheet function is used to calculate the variance based on an entire population?

A. STDEVP ()
B. STDEV.S()
C. VAR ()
D. VARIANCE.P() (1 mark)

ANSWER: D

6. Baraka Limited debt contains provisions to alter the coupon payments if the debt is downgraded by the credit rating agencies. The company uses spreadsheet application as shown below:

	A	B	C	D
1	Leverage	56%		
2	Coupon rate			
3				
4	Leverage	Rating	Coupon rate	
5	0%	Baa1	7.0%	
6	40%	Baa2	7.6%	
7	50%	Baa3	8.2%	
8	60%	Ba1	10.0%	
9				

Which of the following VLOOKUP formulas should be entered in cell B2 to show the result "8.2%"?

A. =VLOOKUP (B1, A5:C8,3, TRUE)
B. =VLOOKUP (B1, A5:C8,2, FALSE)
C. =VLOOKUP (B1, A5:C8,2, TRUE)
D. =VLOOKUP (B1, A5:C8,3, FALSE) (1 mark)

ANSWER: A

7. In bond valuation, how does the bond's full price differ from the flat price (clean price)?

A. The full price includes coupon payments, while the flat price does not
B. The full price excludes accrued interest, while the flat price includes it
C. The full price is the same as the flat price
D. The full price is the price at which the bond is initially issued (1 mark)

ANSWER: A

8. While using the scenario tool in Spreadsheet application, which of the following is **NOT** true? (1 mark)

A. Users can model up to 32 variables using the Scenario tool
B. Scenarios only work with a single worksheet
C. Users can test only one scenario at a time
D. The scenario tool can be found under What-if-analysis in the Data ribbon

ANSWER: C

9. Based on the screenshot below, which of the following formulas would result in the value 7/12/2021?

	A	B	C	D	E	F	G	H
1	Time Periods	10/6/2019	0	1	2	3	4	
2	Monthly Data							
3								
4								
5								
6								
7								
8								
9								

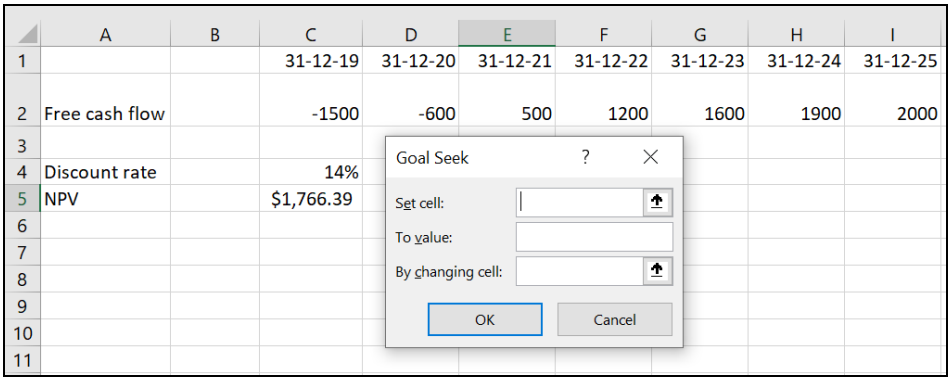
A. =DATE(YEAR(B1+E1),31,12)
B. =DATE((B1+E1),31,12)
C. =DATE(SUM(B1+E1),31,12)
D. =DATE(YEAR(B1)+E1,31,12) (1 mark)

ANSWER: A

10. What does a bond's "money duration" measure in bond valuation?
A. The duration of a bond in terms of its total value
B. The bond's sensitivity to changes in market interest rates
C. The bond's time to maturity
D. The bond's yield-to-maturity (YTM) (1 mark)

ANSWER: B

11. In the image below, the NPV value is calculated based on the discount rate in cell C4 and, the free cash flow amounts in cells C2 to I2, and the dates on which the cash flows took place. If one wants to use the Goal Seek function to determine the discount rate required to achieve an NPV of 2000, what should be input in each of goal seek dialog box fields?



A. Set cell:C4 ; To value 2000 ; By changing cell C5
B. Set cell:2000 ; To value C5 ; By changing cell C4
C. Set cell:C5 ; To value 2000 ; By changing cell C4
D. Set cell:2000 ; To value C4 ; By changing cell C5 (1 mark)

ANSWER: C

12. Which basic model is commonly used for pricing and valuation of forward contracts?
A. Cox-Ross-Rubinstein (CRR) Model
B. Black-Scholes Model
C. Cost-of-Carry Model
D. Risk-Neutral Valuation Model (1 mark)

ANSWER: D

13. Which statistical measure is used to quantify the dispersion or variability of a set of data points in quantitative analysis?
A. Mean
B. Median
C. Mode
D. Standard deviation (1 mark)

ANSWER: D

14. What type of data analysis is used to identify patterns and relationships in data?
A. Descriptive analysis
B. Inferential analysis
C. Predictive analysis
D. Causal analysis (1 mark)

ANSWER: B

15. What is the term used to describe the process of using statistical techniques to identify outliers in data?
A. Data mining
B. Anomaly detection
C. Natural language processing
D. Collaborative filtering (1 mark)

ANSWER: B

16. In predictive modeling, what is a false positive?
A. A prediction of an event that does not actually occur
B. A prediction of an event that actually does occur
C. A variable that is found not to be predictive
D. A variable that is found to be predictive (1 mark)

ANSWER: A

17. In a box plot, what does the horizontal line in the box represents?
A. The mean
B. The mode
C. The standard deviation
D. The median (1 mark)

ANSWER: D

18. What role does data visualisation play in derivative valuation models?
A. To determine the optimal strike price for options contracts
B. To create a graphical representation of market data for better decision-making
C. To automate trading strategies
D. To calculate historical volatility (1 mark)

ANSWER: B

19. What is the most common method used to evaluate the performance of a regression algorithm?
A. Mean squared error
B. Root mean squared error
C. Fowlkes-Mallows index
D. Accuracy (1 mark)

ANSWER: A

20. In data analytics, which technique is used to handle missing data?
A. Data warehousing
B. Data scaling
C. Imputation
D. Normalisation (1 mark)

ANSWER: C

…….

CIFA ADVANCED LEVEL

FINANCIAL MODELLING AND DATA ANALYTICS (PRACTICAL PAPER)

Thursday: 27 April 2023. Morning Paper. Time allowed: 3 hours.

Answer ALL questions in SECTION I and SECTION II and ONE question in SECTION III. SECTION I has twenty (20) Multiple Choice Questions of one (1) mark each. SECTION II has two practical questions of twenty (30) marks each. SECTION III has two practical questions of twenty (20) marks each.

Under SECTION II and III, you are required to create Ms Excel Worksheets with the name of the entity in each question and input your workings and solutions.

SECTION I - TOTAL 20 MARKS

Question One

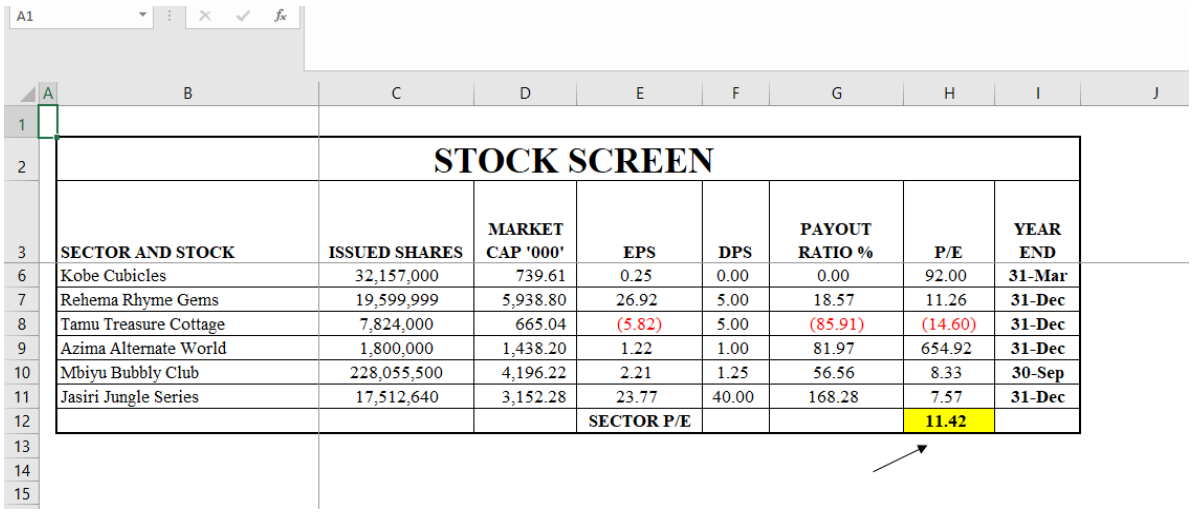
What is the shortcut key you can press to create a copyright symbol?
(1 mark)

A. Alt + Ctrl + C
B. Atl + C
C. Ctrl + C
D. Ctrl + Shift + C

Question Two

Which of the following is the correct formula to calculate the sector P/E in cell H12 as shown below?

(1 mark)



	STOCK SCREEN							
3	SECTOR AND STOCK	ISSUED SHARES	MARKET CAP '000'	EPS	DPS	PAYOUT RATIO %	P/E	YEAR END
6	Kobe Cubicles	32,157,000	739.61	0.25	0.00	0.00	92.00	31-Mar
7	Rehema Rhyme Gems	19,599,999	5,938.80	26.92	5.00	18.57	11.26	31-Dec
8	Tamu Treasure Cottage	7,824,000	665.04	(5.82)	5.00	(85.91)	(14.60)	31-Dec
9	Azima Alternate World	1,800,000	1,438.20	1.22	1.00	81.97	654.92	31-Dec
10	Mbiyu Bubbly Club	228,055,500	4,196.22	2.21	1.25	56.56	8.33	30-Sep
11	Jasiri Jungle Series	17,512,640	3,152.28	23.77	40.00	168.28	7.57	31-Dec
12				SECTOR P/E			11.42	

A. =SUMPRODUCT(H6:H11,D6:D11)
B. =AVERAGE(H6:H11)

C. =SUM(D6:D11)*1000000/SUMPRODUCT(C6:C11,E6:E11)
D. =SUM(D6:D11)*1000000/SUM(C6:C11,E6:E11)

Question Three

Company A is looking into four potential projects and will accept them if the internal rate of return(IRR) is 10% or above, as shown in cell E2. What is the formula used in cell C2, which can be copied down to cell C3 through C5, to generate the results shown below?

(1 mark)

	A	B	C	D	E	F	G
1		**IRR**	**Accept or Reject**		**Decision Rule**		
2	Project 1	12.5%	Accept		10%		
3	Project 2	9.3%	Reject				
4	Project 3	8.2%	Reject				
5	Project 4	11.1%	Accept				
6							
7							

A. =IF(B2>=E2,"Accept","Reject")
B. =IF(B2>=$E2,"Accept","Reject")
C. =IF(B2>=E$2,"Accept","Reject")
D. =IF(B2>=E2,"Accept","Reject")

Question Four

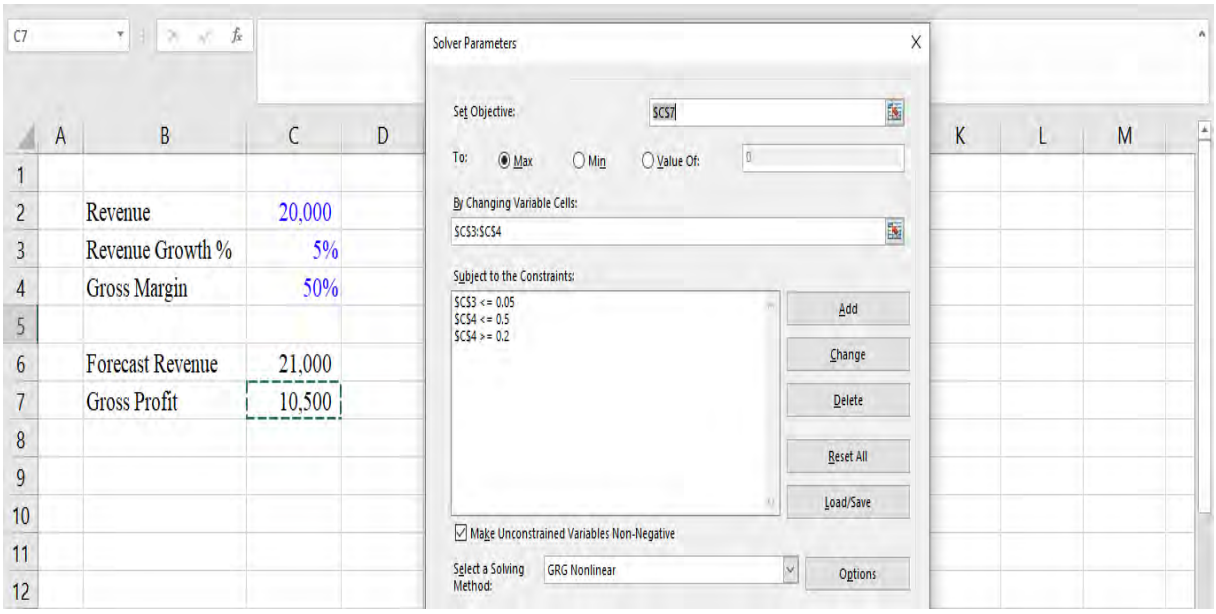
What is the best practice for financial modeling in excel?
(1 mark)

A. Use black font for all hard-coded numbers and formulas and blue font for only the totals
B. Use blue font for all hard-coded numbers and formulas and black font for only the totals
C. Use blue font for hard-coded numbers and black font for formulas
D. Use black font for hard-coded numbers and blue font for formulas

Question Five

Based on the provided screen shot of a solver setting, which of the following descriptions is correct?

(1 mark)



A. The user is trying to minimize the gross profit by changing the revenue growth % and gross margin, with the constraints that the revenue growth % must be less than or equal to 5% and the gross margin must be between 20% and 50%
B. The user is trying to minimize the gross profit by changing the revenue growth % and gross margin, with the constraints that the revenue growth % must be greater than 5% and the gross margin must be between 20% and 50%
C. The user is trying to maximize the gross profit by changing the revenue growth % and gross margin, with the constraints that the revenue growth % must be less than or equal to 5% and the gross margin must be between 20% and 50%
D. The user is trying to maximize the gross profit by changing the revenue growth % and gross margin, with the constraints that the revenue growth % must be greater to 5% and the gross margin must be less than 50%

Question Six
What function will result in the total number of entries in the cell range B2 to B9
(1 mark)

	A	B	C	D
1				
2		**Name**	**CAT Marks**	
3		Njambi	15	
4		Akoth	17	
5		Mwende	18	
6		Tinderet	22	
7		Muthwale	20	
8		Waithera	21	
9		Mwanii	15	
10				

A. Count
B. MAX
C. MIN
D. SUM

Question Seven
Which Excel feature would allow you to create a drop-down list of values which users can select from?

(1 mark)

A. Trace Precedents
B. Data Table
C. Data Validation
D. Text to Columns

Question Eight
Which of the following functions would allow one to dynamically calculate the average revenue in cell D7 based on the number of periods (cell G2) and with 2019 as a starting point?
(1 mark)

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2						Number of periods	4					
3												
4												
5		Year				2019	2020	2021	2022	2023	2024	2025
6			Sum	Average								
7		Revenue	429,728	107,432		87,390	115,653	104,792	121,893	128,904	137,650	158,252
8												
9												
10												

A. =MEAN(F7:OFFSET(F7,0,G2-1))
B. =AVERAGE(F7:OFFSET(F7,1,G2-1))
C. =AVERAGE(F7:OFFSET(F7,0,G2-1))
D. =MEAN(F7:OFFSET(F7,1,G2-1))

Question Nine

Based on the screenshot below, which of the following formulas does NOT return the value of 16?

(1 mark)

	A	B	C	D	E	F
1	70					
2	16					
3	28					
4	90					
5	62					
6						
7						
8						
9						
10						
11						

A. =MIN(A1:A5)
B. =SMALL(A1:A5,1)
C. =RANK(A1:A5,1)
D. =LARGE(A1:A5,5)

Question Ten

In which of the following cases should you use data tables? (1 mark)

A. When you want to test the sensitivity of an output variable by changing one or two input variables
B. When you want to determine the required single input by setting a desired output
C. When you want to test a model against multiple scenarios
D. When you want to achieve a desired output by changing multiple inputs and setting constraints

Question Eleven

What is the formula for calculating the expected return on a portfolio of assets?

a. (Weight of Asset A * Expected Return of Asset A) + (Weight of Asset B * Expected Return of Asset B) + ... + (Weight of Asset N * Expected Return of Asset N)
b. (Expected Return of Asset A / Weight of Asset A) + (Expected Return of Asset B / Weight of Asset B) + ... + (Expected Return of Asset N / Weight of Asset N)

c. (Expected Return of Asset A + Weight of Asset A) * (Expected Return of Asset B + Weight of Asset B) * ... * (Expected Return of Asset N + Weight of Asset N)
d. (Weight of Asset A / Expected Return of Asset A) + (Weight of Asset B / Expected Return of Asset B) + ... + (Weight of Asset N / Expected Return of Asset N)

Question Twelve

Which keyboard shortcut is used to display the "Function Arguments" dialog box in Excel?

a. Ctrl + F2
b. Ctrl + Shift + F3
c. Ctrl + Shift + A
d. Ctrl + Shift + #

Question Thirteen

What is the purpose of the Data Understanding step in the CRISP-DM process?

a. To identify and gather data sources
b. To define the problem and understand the business context
c. To clean, integrate and transform data for analysis
d. To evaluate the performance of the model

Question Fourteen

What does the "Volume" in the 5Vs of Big Data refer to?

a. The speed at which data is generated
b. The size of the data being generated
c. The variety of the data being generated
d. The value of the data being generated

Question Fifteen

What is one way to address the issue of privacy in data analytics?

a. Store all data in the cloud
b. Use anonymization techniques on sensitive data
c. Share all data with third parties
d. Keep all data in a single database

Question Sixteen

What is one way to address the issue of transparency in data analytics?

a. Use proprietary algorithms for analysis
b. Only use numerical data for analysis
c. Document the analysis process and results
d. Use a single data source for analysis

Question Seventeen

Which cloud computing platform is known for its data management and analytics capabilities?

a. Azure
b. AWS
c. Google Cloud
d. IBM Cloud

Question Eighteen

What are some benefits of using data visualization?

a. It helps to identify trends and patterns in data
b. It makes it easier to communicate complex data to non-technical audiences
c. It enables users to make more informed decisions based on data insights
d. All of the above

Question Nineteen

Which of the following Excel charts is best suited for showing the composition of a whole?

a. Bar chart
b. Line chart
c. Pie chart
d. Scatter plot

Question Twenty

Which of the following is a limitation of using analytics tools in business data analytics?

a. They can provide too much data, making it difficult to identify relevant insights
b. They require little to no technical expertise to use effectively
c. They can analyze unstructured data as well as structured data
d. They are not affected by data quality issues, such as missing or incomplete data

SECTION II – TOTAL 60 MARKS

Question Twenty One

You are a financial analyst at Beta Ltd., a company that is considering acquiring Alpha Ltd. You have been tasked to perform a discounted cash flow (DCF) valuation analysis in Excel to determine the value of the target company and advise on whether the acquisition would be financially beneficial.

The following information is provided:

1. Alpha Ltd. revenues were Sh.12.5 million. This revenue is expected to grow at a constant annual growth rate of 7.5% over the next 5 years.
2. Alpha's Ltd. gross profit margin is 75%.

3. The target company currently has Sh.8 million in debt and Sh. 3 million in equity.
4. Selling General, Administration and other expenses is expected to be 45% of sales
5. Depreciation is expected to be 2.5% of sales
6. Net capital expenditures are expected to be 2.5% of net revenue annually.
7. Changes in net working capital are expected to amount to Sh.500,000, Sh.600,000, Sh.700,000, Sh.800,000 and Sh.900,000 in the next 5 years respectively.
8. The cost of debt is 12.5%
9. After the sixth year, free cash flows are expected to grow at a rate of 3% per year indefinitely.
10. The risk-free rate is 7.5%.
11. The expected market rate of return is 13.75%
12. The industry beta is 1.85
13. The corporate tax rate is 25%
14. The number of outstanding ordinary shares is 500,000.

Required:

Using the DCF valuation method:

a) Calculate the present value of the target company's free cash flows, terminal value, and the total enterprise value. (26 marks)

b) Determine the value of the equity and the price per share for the target company. (4 marks)

(Total: 30 marks)

Question Twenty Two

As a senior financial analyst at Wemma Capital, you have been tasked by the chief investment manager to develop a financial model for a new startup company that plans to manufacture and sell electric bikes components in the country.

The following information is provided:

1. The company is expected to produce 1,000,000 units annually.
2. The unit selling price is expected to be Sh.18.50 in 2024.
3. The unit selling price is expected to increase by 5% annually.
4. The cost of goods sold (percentage of revenue) is 42.0%.
5. The salaries and benefits expense (percentage of revenue) is 17.0%.
6. The annual rent and overhead expense are Sh. 500,000.
7. Depreciation and amortisation (percentage of property, plant and equipment) is 25.0%.
8. Interest rate (percentage of debt) is 10.0%.
9. The applicable tax rate is 30.0%.
10. The accounts receivable (Days) is 30.
11. The inventory (Days) is 14.
12. The accounts payable (Days) is 30.
13. Capital expenditures in year 0 is percentage Sh.15,000,000. It will be funded by debt issuance of Sh.5,000,000 and equity of Sh.10,000,000.

Required:

Using Excel:

(a) Prepare the following financial statements:

i. Statement of profit or loss for the five-year period (8 marks)

ii. Statement of financial position for the five-year period (6 marks)

iii. Cash flow statement for the company for the five-year period (6 marks)

(b) Undertake a analysis and compute the following financial ratios for the five years:

i. Profitability - Return on Assets, Return on Equity, Net Profit Margin Ratio (5 marks)

ii. Liquidity - Current Ratio, Quick Ratio (5 marks)

(Total: 30 marks)

Section III-20 Marks

Question Twenty Three

You are provided with the following information for various pension schemes in your country:

Individual Pension Plan Asset Allocation

	Current Allocation	**Regulator Limit**	**Investment Policy Statement (IPS)Target**	**Investment Policy Statement (IPS) Minimum**
Equities	22.71%	70%	55%	30%
Listed Corporate Bonds	9.26%	20%	5%	0%
Treasury Bonds	36.12%	90%	20%	10%
Mutual Funds	10.36%	15%		
Fixed Deposits	15.27%	30%	10%	10%
Call Deposits	6.47%	5%	5%	
Cash	0.40%			
Commercial Paper			5%	0%
Equities listed in East Africa			5%	0%

Baloon Pension Asset Allocation

	Current Allocation	**Regulator Limit**	**IPS Target**	**IPS Minimum**
Equities	4.87%	70%	55%	30%
Listed Corporate Bonds	21.85%	20%	5%	0%

Treasury Bonds	70.68%	90%	20%	10%
Cash	2.59%	5%	5%	0%

Mwalimu Pension Asset Allocation

	Current Allocation	Regulator Limit	IPS Target	IPS Maximum
Equities	23.97%	70%	55%	70%
Listed Corporate Bonds	1.20%	20%	10%	30%
Unlisted Corporate Bonds	6.20%	10%		
Treasury Bonds	30.87%	90%	24%	70%
Treasury Bills	16.33%	90%		
Fixed Deposits	12.43%	30%	10%	30%
Call Deposits	8.43%	5%	1%	5%
Cash	0.44%			

Kampuni Staff Pension Scheme Asset Allocation

	Current Allocation	Regulator Limit	IPS Target	IPS Range
Equities	23.21%	70%	25%	0%-40%
Listed Corporate Bonds	11.26%	20%	5%	0%-30%
Unlisted Corporate Bonds	13.36%	10%		
Commercial Paper	9.86%			
Treasury Bonds	21.97%	90%	60%	0%-90%
Treasury Bills	12.09%	90%		
Fixed Deposits	6.26%	30%	8%	0%-15%
Cash	1.48%	5%	2%	0%-5%

Required:

a) Develop a chart for each pension scheme that compares the current allocation (clustered column) with the regulator limit (line) for all the pension schemes providing a title for each. Use a secondary axis for the current allocation.

(8 marks)

b) Using the information presented below, develop a forecast sheet that predicts different forecast options that includes lower and upper confidence bounds up to year 2022

(4 marks)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
B Fund Value	10,000	9,114	10,365	12,070	13,672	14,566	14,853	15,528	15,827	16,221

c) The following table contains information based on 91,182 and 364 day T-bills

	7th July2017	6th July 2018	5th July 2019
91-day	8.22	7.73	6.69
182-day	10.31	9.50	7.40
364-day	10.89	10.44	8.61
2	11.06	11.43	9.55
3	11.97	11.62	9.91
4	12.34	11.70	10.14
5	12.39	12.00	10.26
6	12.62	12.10	10.62
7	12.78	12.35	10.85
8	12.80	12.51	11.25
9	12.85	12.65	11.53
10	13.08	12.76	11.60
11	13.19	12.89	11.76
12	13.25	12.96	11.91
13	13.27	12.97	12.08
14	13.28	13.05	12.13
15	13.32	13.06	12.32
16	13.34	13.07	12.40
17	13.44	13.15	12.47
18	13.57	13.23	12.50
19	13.66	13.26	12.60
20	13.69	13.32	12.62
21	13.76	13.33	12.70
22	13.82	13.34	12.73
23	13.87	13.35	12.86
24	13.92	13.35	12.88

Required:
Construct the yield curve for the three periods. Include a chart title and label the axes

(8 marks)
(**Total: 20 marks)**

Question Twenty Four

a) The data in the table below has been collected by Elena Kabue to appraise the performance of four asset management firms:

	Fund 1	Fund 2	Fund 3	Fund 4	Market Index
Return	6.45%	8.96%	9.44%	5.82%	7.60%
Beta	0.88	1.02	1.36	0.80	1.00

Standard Deviation	2.74%	4.54%	3.72%	2.64%	2.80%

Required:

If the risk-free rate of return for the relevant period is 3%. Calculate the ex post alpha, Treynor measure, Sharpe ratio, and M2. Rank the funds using a radar chart and identify which one you would select.

(10 marks)

b) The following information has been provided to you as the chief financial analyst for analysis:

	Yr 1	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Yr 6**
Revenues	-	-	75,000	75,000	75,000	75,000
Expense 1	-	-	*8,000*	*8,000*	*8,000*	*8,000*
Expense 2	*500*	*500*	*1,000*	*1,000*	*1,000*	*1,000*
Expense 3	-	-	*12,500*	*12,500*	*12,500*	*12,500*
Expense 4	-	-	*6,300*	*6,300*	*6,300*	*6,300*
Profit	**(500)**	**(500)**	**47,200**	**47,200**	**47,200**	**47,200**
Capital Investment	50,000	50,000	100	100	100	100
Cash Flow (Annual)	**(50,500)**	**(50,500)**	**47,100**	**47,100**	**47,100**	**47,100**
Cash Flow (Cumulative)	**(50,500)**	**(101,000)**	**(53,900)**	**(6,800)**	**40,300**	**87,400**

Required:

i. Assume that you want to appraise the capital investment at 10%, 15% and 20% interest rate, compute the NPV. (6 marks)

ii. Compute the IRR and payback period. (2 marks)

iii. Develop a combo chart for the cash flow (annual) as well as (cumulative) (2 marks)

(Total: 20 marks)

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