**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 1 December 2025. Morning Paper.** **Time Allowed: 3 hours.**

**This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Answer ALL questions. Marks allocated to each question are indicated in the question.**

**Required Resources:**
- **Windows or Linux PC**
- **Internet connection**
- **GNS3 or Packet tracer**

**SECTION I (40 MARKS)**

1. Imagine a company needs to send an urgent safety alert to all employees' computers in the office at the same time. Which type of network addressing would allow one system to send that message instantly to every device on the local network? (2 marks)



2. A university upgrades its campus Wi-Fi to support higher speeds and dual frequency bands for smooth video lectures. Which modern standard allows high-speed Wi-Fi on 5 GHz? (2 marks)

3. An IT administrator needs to ensure that only authorised laptops and phones can connect to the office network by verifying each device's unique hardware address. Which filtering method is used to implement this type of access control? (2 marks)

4. _____ is a design approach in computer networking that aims to simplify the network structure by reducing the number of routers and switches, thereby minimising cost, maintenance and administration. (2 marks)

5. A security-conscious company wants to manage its servers remotely while preventing hackers from eavesdropping on credentials. Which protocol ensures secure remote administration of network devices by encrypting all communication between client and server? (2 marks)

6. A technician needs to know the largest size of data in a network that can be transmitted at once over a given network medium without fragmentation. What is the term used to describe the maximum size of data that can be transmitted in a single frame over a network medium? (2 marks)

7. A developer compresses images and encrypts sensitive information before sending it across the network. At which Open Systems Interconnection model (OSI) layer does data encryption and compression occur? (2 marks)

8. A streaming service sends a video feed to selected subscribers, not to all devices on the internet. The type of logical address used when data is intended for multiple hosts within a specific group, rather than all hosts is referred to as _____. (2 marks)

9. Which connectionless communication protocol is used on the internet for time-sensitive tasks such as video streaming or DNS lookups and operates without guaranteeing delivery, order or error checking? (2 marks)

10. XYZ, a newly established branch office, experiences frequent network loops that bring the entire LAN down. Which protocol is specifically designed to prevent this problem in a switched environment? (2 marks)

11. A network device needs to automatically configure its IP address within a subnet without external help. In the context of IPv6 addressing, which prefix is reserved for link-local communication within a single subnet? (2 marks)

12. A technician connects a router to a switch using Ethernet ports. Which type of cable is typically used to connect a switch to a router's Ethernet interface? (2 marks)

13. A hospital wants its VoIP calls to be clearer, even during heavy file transfers. Which mechanism should be implemented to prioritise voice traffic over other network data? (2 marks)

14. Which routing algorithm finds the least-cost path between source and destination nodes by using global knowledge about the network? (2 marks)

15. A system administrator wants to capture and analyse suspicious real-time traffic on a network interface. Which tool can be used for packet sniffing and protocol analysis? (2 marks)

16. An upcoming small business enterprise chemist is allocated a /26 network and wants to determine how many usable devices it can support. How many usable host addresses are available in a /26 network? (2 marks)

17. A network engineer decides to combine four contiguous /24 networks into a single larger block to simplify routing. After performing supernetting, what is the new prefix length of the summarised network? (2 marks)

18. A technician needs to allow a private IP device to access the internet using a single public IP address. Which mechanism translates private IP addresses to a public IP address for outgoing traffic? (2 marks)

19. A laptop connects to a network and automatically receives an IP address, subnet mask, gateway and DNS settings. Which protocol is primarily used for automatic host configuration? (2 marks)

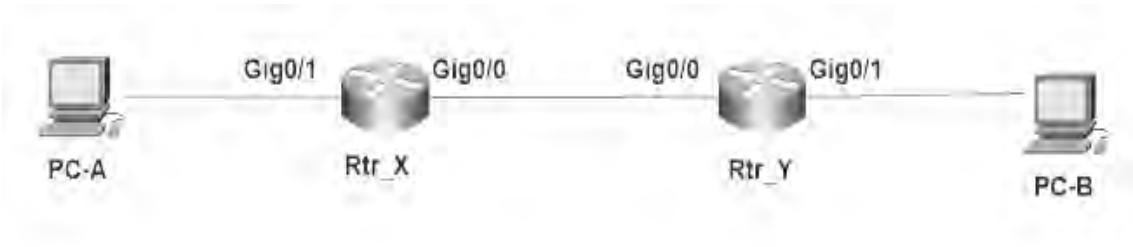
20. A microfinance institution wants to ensure that data is delivered in the correct sequence and without errors during video conferencing. Which protocol provides reliable, connection-oriented communication over IP networks? (2 marks)



**SECTION II (60 MARKS)**

21. Create a word processor document named "QUESTION 21" and use the document to save solution to questions (a) to (f) below. Capture and present screenshots of the configured settings.

Using GNS3 or packet tracer, configure the topology as shown below:




| Device | Interface | IP Address | Subnet Mask | Gateway |
|---|---|---|---|---|
| Rtr_X | Gig0/0 | 192.168.100.1 | 255.255.255.0 | N/A |
| | Gig0/1 | 192.168.101.1 | 255.255.255.0 | N/A |
| Rtr_Y | Gig0/0 | 192.168.100.2 | 255.255.255.0 | N/A |
| | Gig0/1 | 192.168.102.1 | 255.255.255.0 | N/A |
| PC-A | NIC | 192.168.101.2 | 255.255.255.0 | 192.168.101.1 |
| PC-B | NIC | 192.168.102.2 | 255.255.255.0 | 192.168.102.1 |

**Required:**

(a) Using a suitable network simulator/emulator, design and implement the network topology provided in the diagram above. Ensure that all devices are correctly interconnected and configured with the appropriate interface settings. (2 marks)

(b) Test connectivity between the following devices:

(i) PC-A and Rtr_X (1 marks)

(ii) PC-B and Rtr_Y (1 marks)

(iii) Rtr_X and Rtr_Y (2 marks)

(c) From Rtr_X Configure a Warning banner (4 marks)

(d) On Rtr_X, set the minimum password length to 12 characters. (4 marks)

(e) Test the configuration done in part (d) above on Rtr_X. (2 marks)

(f) Set the execution session of the router to stay idle for 5 minutes 30 seconds before the router automatically disconnects the user. (4 marks)

Save "QUESTION 21" document and upload. **(Total: 20 marks)**

22. Create a word processor document named "QUESTION 22" and use the document to save solution to questions (a) to (d) below. Capture and present screenshots of the configured settings.

Use the topology created in "QUESTION 21" above, to answer the following questions:



(a) Configure Static Routing Protocol on Rtr_X and Rtr_Y. (6 marks)

(b) On Rtr_Y use an appropriate command to display the routing table. (4 marks)

(c) Configure Rtr_Y to be accessed remotely using Secure Shell (SSH). (6 marks)

(d) Access Rtr_Y remotely using PC-B. (4 marks)

Save "QUESTION 22" document and upload. **(Total: 20 marks)**

23. You work as a network administrator at a global pharmaceutical company. Several users have reported connectivity and configuration challenges that require diagnosis. Create a word processor document named "QUESTION 23" and use the document to save solutions to questions (a) to (e) below.

Capture and present screenshots of the configured settings.

Using your appropriate command utility on your Windows or Linux computer to answer the following questions:

(a) A staff member reports difficulty accessing an external website. As the network administrator, use a suitable command-line tool to trace the route packets take to reach www.microsoft.com and interpret the key results. (4 marks)

(b) During troubleshooting, you suspect duplicate IP addresses on the local network. Use a suitable network diagnostic tool to examine the ARP cache and explain how the output can assist in detecting address conflicts. (4 marks)

(c) To verify correct addressing, subnetting and DNS configuration, apply the appropriate command-line instruction to display the full network configuration of your system. Present and analyse the results. (4 marks)

(d) Security monitoring often requires observing which applications are establishing connections. Use a command-line utility to list all processes currently bound to active ports and explain how this information can aid in detecting suspicious activity. (4 marks)

(e) Efficient data delivery depends on the system's routing setup. Employ the relevant command to show the active routing table entries of your workstation, emphasising the role of the default route in network communication. (4 marks)

Save "QUESTION 23" document and upload. **(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 18 August 2025. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are indicated in the question.**

**Required Resources:**

- **Windows or Linux PC**
- **Internet connection**
- **GNS3 or Packet tracer**

**SECTION I (40 MARKS)**

1. The process of determining the path for data packets to travel from a source to a destination is called _____. (2 marks)

2. Which system is responsible for translating domain names such as www.kasneb.com into an IP address such as 192.168.12.6? (2 marks)

3. The process of wrapping data with headers and trailers as it moves through the different layers of the communication protocol is called _____. (2 marks)

4. Mr. Juda Lamesh seeks to improve the network's performance, security and efficiency. What technique is used to divide a network or data into smaller, more manageable parts? (2 marks)

5. What term describes the method used to define the messages exchanged between source and destination computing devices?
(2 marks)

6. In communication models, devices often exchange data through mechanisms where one sends a request and then waits for a response before continuing. What method allows a computer to react accordingly when it requests data from a server and the server takes too long to respond? (2 marks)

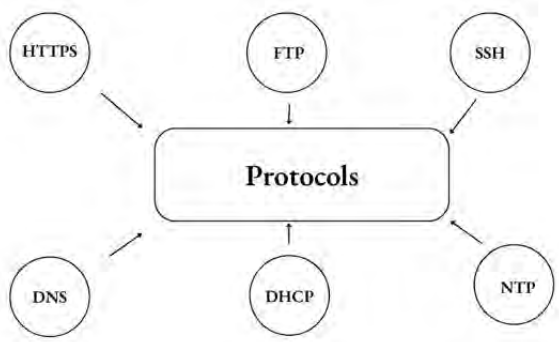
7. Which layer in the Transport Control Protocol/Internet Protocol (TCP/IP) model handles the routing of data packets across networks deciding on the most efficient path for data to reach its destination. (2 marks)

8. Two networks X and Y, have the same bandwidth. However, Network X has higher latency compared to Network Y. Based on this difference, which network is more suitable for real-time communication applications such as Zoom video calls? (2 marks)

9. One of the oldest and the most widely used email protocols designed to work on the application layer of the Internet protocol suite that is used to receive and retrieve emails from a mail server to a local client is known as _____. (2 marks)

10. In a multicast-enabled network, which address range is specifically, reserved for multicast traffic? (2 marks)

11. Refer to the graphic below. Identify the type of protocol used to synchronise clocks between computer systems over packet-switched networks. (2 marks)

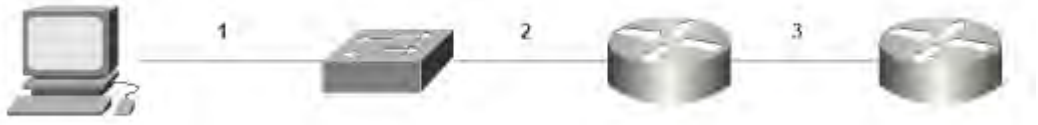



12. Which layer of th
(2 marks)

13. Which hardware device is used at the physical layer of the OSI model to connect multiple devices in the network? (2 marks)

14. Supah Television is facing inconsistent video conferencing quality at its remote branches. What term describes the successful transfer of data across a network within a specific time frame, typically measured in bits per second (bps), kilobits per second (kbps), or megabits per second (Mbps)? (2 marks)

15. Refer to the exhibit below where end devices and intermediary devices are connected using Unshielded Twisted Pair (UTP) cables. Which type of UTP cable is most appropriate for connection 3, where two network devices of the same type are connected directly? (2 marks)




16. How many host addresses are available on the network 192.168.0.0 with a subnet mask of 255.255.255.224? (2 marks)

17. Which is the type of IP (Internet Protocol) address that is used to send messages or data packets simultaneously to all devices on a local area network (LAN)? (2 marks)

18. What is the shortest abbreviation for the IPv6 address 2001:0DB8: CAFE: 0001:0000:0000: 0000:0001/64 (2 marks)

19. _____ is a communications network access method that uses a continuously repeating frame that is transmitted onto the network by the controlling computer. (2 marks)

20. A newly connected workstation in a manufacturing company fails to obtain an IP address from the DHCP server. The computer assigns itself an IP address in the 169.254.x.x range. Which protocol feature is responsible for this automatic configuration? (2 marks)

## SECTION II (60 MARKS)

**Required Resources:**

- **Windows or Linux PC**
- **Internet connection**
- **GNS3 or Packet tracer**

21. Create a word processor document named "Question 21" and use the document to save solution to questions (a) to (b) below. Capture and present screenshots of the configured settings.

Using GNS3 or packet tracer, configure the topology shown below:



| Device | Interface | IP Address | Subnet Mask | Gateway |
|---|---|---|---|---|
| Router_A | Gig0/0 | 192.168.0.1 | 255.255.255.0 | N/A |
| Switch_A | VLAN | 192.168.0.2 | 255.255.255.0 | 192.168.0.1 |
| FINANCE_PC | NIC | 192.168.0.3 | 255.255.255.0 | 192.168.0.1 |
| SALES_PC | NIC | 192.168.0.4 | 255.255.255.0 | 192.168.0.1 |

**Required:**

(a) Design the network topology as shown above using appropriate simulator. (2 marks)

(b) Test connectivity between the following devices:

(i) FINANCE_PC and SALES (2 marks)

(ii) Router_A and Swicth_A. (2 marks)

(iii) From Switch_A configure default-gateway using IP address of the Router. (4 marks)

(iv) Use appropriate command-line utility to display Layer I and Layer II status. (2 marks)

(v) Use the appropriate command to display both dynamic and static MAC address entries on the switch. (2 marks)

(vi) Use the Link Layer Discovery Protocol (LLDP) on the router to Configure and identify devices directly connected to it. (6 marks)

Save "Question 21" document and upload. **(Total: 20 marks)**

22. Create a word processor document named "Question 22" and use the document to save answers to questions (a) to (d) below. Capture and present screenshots of the configured settings.

Use the topology created in "Question 21" above to answer the following questions.

(a) A user on Finance_PC needs to remotely access a router using the SSH protocol. Display the configuration steps for enabling SSH on the router using the CLI. (6 marks)

(b) Use the recommended procedure to remotely access Router_A via SSH from the SALES_PC command prompt. (4 marks)

(c) Use the appropriate command to configure the router so that it does not attempt to translate domain names as hostnames and verify your configuration. (5 marks)

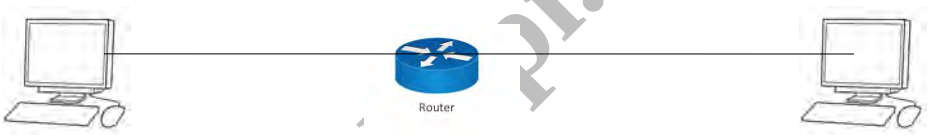
(d) Configure the switch port connected to the router as a trunk port and verify the configuration. (5 marks)

Save "Question 22" document and upload. **(Total: 20 marks)**

23. Create a word processor document called "Question 23" and use it to save the captured screenshots for the questions below:

Using an appropriate simulator, configure the topology as shown below:

PC 1 (G0/0) R1 (G0/1) PC 2




| Device | Interface | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|---|
| PC 1 | NIC | 192.168.1.10 | 255.255.255.0 | 192.168.1.1 |
| PC 2 | NIC | 192.168.2.10 | 255.255.255.0 | 192.168.2.1 |
| Router | G 0/0( to PC 1) | 192.168.1.1 | 255.255.255.0 | - |
| Router | G 0/1 (to PC 2) | 192.168.2.1 | 255.255.255.0 | - |

**Required:**

(a) Configure the static IP addresses of the following as per the table.

(i) PC 1. (2 marks)

(ii) PC 2. (2 marks)

(b) Configure and enable the interfaces on the router.

(i) G 0/0. (3 marks)

(ii) G 0/1. (3 marks)

(c) Configure the Router hostname as R1 and set the enable secret password to secure123. (4 marks)

(d) From PC1, test connectivity to PC2. (3 marks)

(e) Create a folder named **Our Resources** on your desktop and enable sharing of the folder with Read only access for the others in the network. Capture the screen shot. (3 marks)

Save "Question 23" document and upload. **(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 2 December 2024. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are indicated in the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Wireshark**
- **Packet tracer/GNS3**

**SECTION I (40 MARKS)**



1. You're configuring a network and need to assign unique IPv6 addresses to each device. One of the devices has the address 2001: ABCD: DAFE:1000::100/64. To ensure appropriate configuration, you must determine the host identification for this IPv6 address. What is the host ID for 2001: ABCD: DAFE:1000::100/64? (2 marks)

2. In networking, what name is used to refer to traffic control mechanisms that seek to differentiate performance based on application or network-operator requirements or provide predictable or guaranteed performance to applications, sessions or traffic aggregates? (2 marks)

3. Which technique do multilayer switches use to enhance network performance by routing traffic based on the destination IP address instead of solely relying on the MAC address? (2 marks)

4. Which is the protocol in networking that helps hosts to decide when to send packets on a shared network segment and how to detect collisions if they occur? (2 marks)

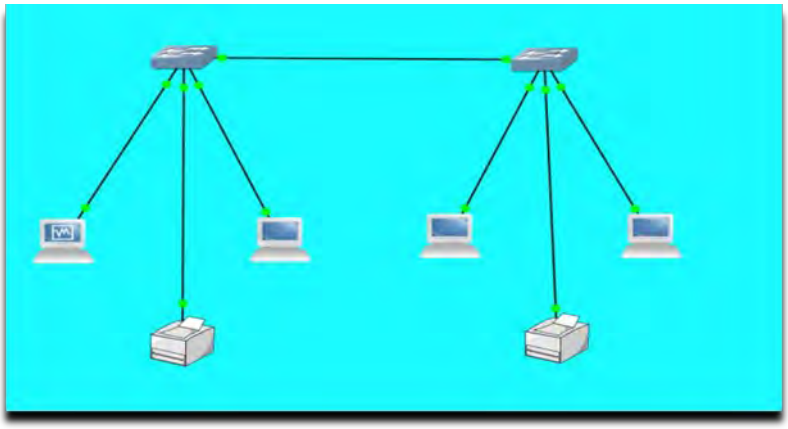
5. Which is the topology that refers to the strategic organisation of network architecture that provides compute to edge devices within an enterprise network? (2 marks)

6. A system that delivers content or services to end users over the internet by storing, processing and serving web pages to clients, typically web browsers is known as _____. (2 marks)

7. What is the name of a standard protocol for accessing email on a remote server from a local client? (2 marks)

8. Which is the networking technique that allows multiple machines to share the same IP address and based on the location of the user request, the routers send it to the machine in the network that is closest? (2 marks)

9. Identify the network design shown in the diagram below: (2 marks)



10. Which is the network topology that combines two or more different network topologies and makes use of standards such as Wi-Fi and Ethernet for performing its different operations? (2 marks)

11. The following describes how a web server application is configured to listen on various ports:

    Application A: 8080, 8443
    Application B: 80, 443
    Application C: 22

    Given that Application A listens on ports 8080 and 8443, Application B listens on ports 80 and 443 and Application C listens on port 22, what are the **TWO** commonly used ports, not officially registered by Internet Assigned Numbers Authority (IANA) but widely recognised in practice across all three applications? (2 marks)

12. Network design strategy that ensures minimal disruption to network operations in the event of a component failure is known as _____. (2 marks)

13. Network optimisation enhances speed, reliability and overall user experience. What is the name given to a technique used to optimise network resource allocation and minimise congestion in a growing network infrastructure? (2 marks)

14. A specific frequency range within the broader radio spectrum that is used for communication between devices is known as _____. (2 marks)

15. Subnetting improves network efficiency, security and scalability. Which method is deployed to consolidate subnet 192.168.10.0/27 back to 192.168.10.0/24? (2 marks)

16. What type of IP addresses do routers use to connect private networks to the internet? (2 marks)

17. Which technique do Layer 3 devices use in an internetwork to translate private IP addresses of internal devices for internet access? (2 marks)

18. Which technique is used to reserve bandwidth for specific applications to guarantee consistent performance in a network? (2 marks)

19. Network communication involves the exchange of data between connected devices. Which mechanism is responsible for selecting the best path to route data between different networks? (2 marks)

20. In network design, which feature offers a more adaptable and efficient method for subnetting, helping to reduce IP address wastage and meet specific host requirements effectively? (2 marks)

## SECTION II (60 MARKS)

**Required Resources:**

- **GNS3 or Packet tracer**
- **Internet connection**
- **Windows or Linux PC**

21. Create a word processor document named "Question 21" and use the document to save solution to questions (a) to (f) below. Capture and present screenshot of the configured settings.

Using GNS3 or packet tracer, configure the topology as shown below:


| Device | Interface | IP Address | Subnet Mask | Gateway |
|---|---|---|---|---|
| RX | Gig0/0 | 192.168.0.1 | 255.255.255.0 | N/A |
| | Gig0/1 | 192.168.1.1 | 255.255.255.0 | N/A |
| PC-W | NIC | 192.168.0.2 | 255.255.255.0 | 192.168.0.1 |
| PC-Y | NIC | 192.168.1.2 | 255.255.255.0 | 192.168.1.1 |



(a) Display configuration of PC_W. (4 marks)

(b) Display configuration of the Router's interfaces. (3 marks)

(c) From PC-W, test connectivity to PC-Y. (3 marks)

(d) Use appropriate command utility to display the intermediary device routing table**.** (2 marks)

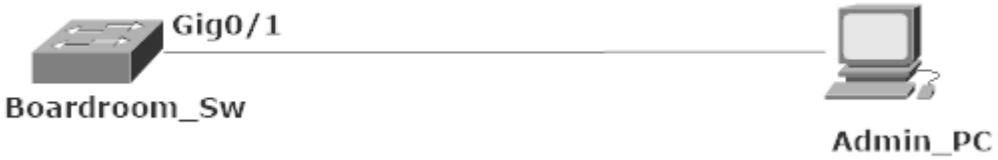
(e) Set and display the system clock. (2 marks)

(f) Configure the VTY lines to automatically log out after 3 minutes of inactivity and prevent console messages from disrupting command input. (6 marks)

Save "Question 21" document and upload. **(Total: 20 marks)**

22. Create a word processor document named "Question 22" and use the document to save solution to questions (a) to (d) below. Capture and present screenshot of the configured settings.

Using GNS3 or packet tracer, configure the topology as shown below:



| Device | Interface | IP Address | Prefix |
|---|---|---|---|
| Boardroom_Sw | VLAN | 2001:DB8: CAFÉ:10::1/64 | /64 |
| Admin_PC | NIC | 2001:DB8: CAFÉ:10::2/64 | /64 |

**Required**

(a) Configure IPv6 address on the VLAN interface of the switch. (6 marks)

(b) Using Admin_PC display the following:

(i) The Link local IPv6 address of the PC. (3 marks)

(ii) Reachability to the localhost. (3 marks)

(c) Use the relevant intermediary device command to display spanning-tree subsystem. (4 marks)

(d) Configure the switch to use "kas_neb@2030" as the privileged mode password. Then, use the appropriate command to display the password in its encrypted form. (4 marks)

Save “Question 22” document and upload. **(Total: 20 marks)**

23. Create a word processor document named “Question 23” and use the document to save solution to questions (a) to (d) below. Capture and present screenshot of the configured settings.

Using your appropriate command utility on your windows or linux computer answer the following questions:

(a) Using www.gmail.com as the hostname, resolve its IP address before sending ICMP echo requests to the target. (6 marks)

(b) Display your network configuration details. (4 marks)

(c) Display the routing table. (4 marks)

(d) Use the appropriate command utility to trace the route from your computer to the Google DNS server, targeting a specific destination on the IPv4 network. (6 marks)

Save “Question 23” document and upload. **(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 19 August 2024. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are indicated in the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Wireshark**
- **Packet tracer/GNS3**

**SECTION I (40 MARKS)**



1. A system for coordinating and arbitrating access to a shared communication network channel is known as _____. (2 marks)

2. Mary, a newly hired IT intern for an orthopedic hospital, was asked to identify valid host addresses from 192.168.0.0/28 IP Address for use in one of the departments. What is the last valid host address for the second network? (2 marks)

3. An Internet Protocol version 4 (IPv4) address is a numerical label assigned to each device connected to a computer network. List **TWO** components of an IPv4 address. (2 marks)

4. The interface that a computer uses to talk to and exchange data with a modem and other serial devices is known as _____. (2 marks)

5. The standardised twisted pair cable with a spline (separator) to reduce interference between twisted pairs Ethernet and other physical layers of networks? (2 marks)

6. The type of Network used to connect storage devices in a data center for high performance and availability is known as _____. (2 marks)

7. In the context of OSI Model, which layer is responsible for establishing a temporary communication session between the source and destination host applications? (2 marks)

8. What mechanism provides a fallback IP address when a device fails to obtain one from a DHCP server? (2 marks)

9. Which is the network topology that features two interconnected rings and allows data to flow in opposite directions for enhanced reliability and fault tolerance? (2 marks)

10. Which Wi-Fi security protocol uses the Simultaneous Authentication of Equals (SAE) authentication mechanism to protect against offline dictionary attacks? (2 marks)

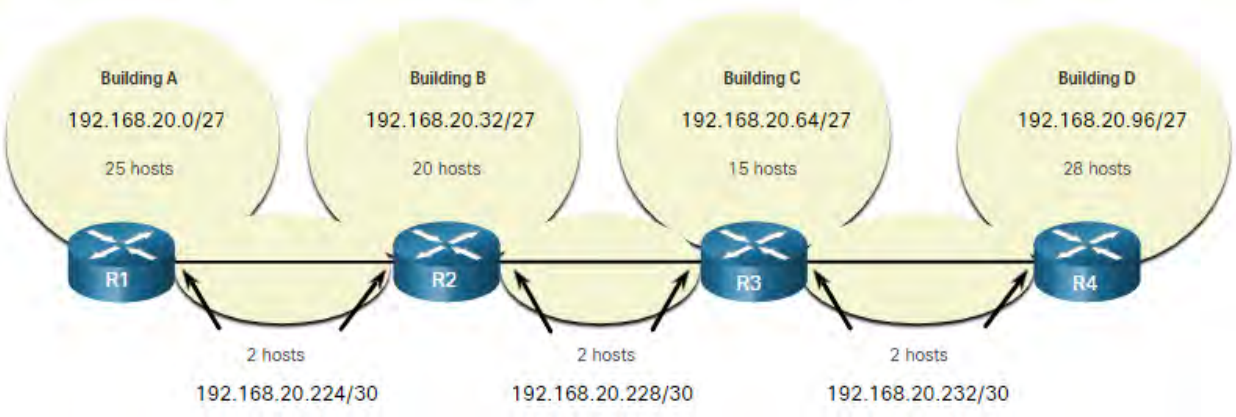
11. What is the network address for the IPv6 address 2001: ABCD: CAFE:100::100/64? (2 marks)

12. Identify the networking device shown in the diagram below: (2 marks)

13. A type of IPv6 address that is used for communication within a single network segment or link is known as _____. (2 marks)

14. The routing algorithms that change their routing decisions whenever network topology or traffic load changes are known as _____. (2 marks)

15. Referring to the diagram below, which subnetting scheme reduces the number of addresses per subnet to a size adequate for networks that require fewer subnets? (2 marks)




16. What TCP feature is used to improve speed by allowing a device to provide a consistent stream of segments as long as it receives the requisite acknowledgements? (2 marks)

17. What mechanism enables a system to automatically switch to a backup component when a problem occurs? (2 marks)

18. Identify the networking tool shown in the diagram below: (2 marks)

19. Which network device supports client requests for resources from other servers while also offering security, anonymity, load balancing and caching? (2 marks)

20. The port that FTP normally uses for data transfer is called _____. (2 marks)

## SECTION II (60 MARKS)

**REQUIRED RESOURCES:**

- **GNS3 or Packet tracer**
- **Internet connection**
- **Windows or Linux PC**

21. Create a word processor document named "Question 21" and use the document to save solution to questions (a) to (f) below.

Using GNS3 or packet tracer, configure the topology as shown below:


| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| Router_1 | Gig0/0/0 | 172.16.10.1 | 255.255.255.0 |
| Comp_A | NIC | 172.16.10.2 | 255.255.255.0 |

**Required:**

(a) Display configuration of the intermediary and end devices Layer III address for:

(i) Router_1. (3 marks)

(ii) Comp-A. (2 marks)

(b) Set the router's domain name as kas-lab.com (3 marks)

(c) Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names. (3 marks)

(d) Encrypt the plaintext passwords. (3 marks)

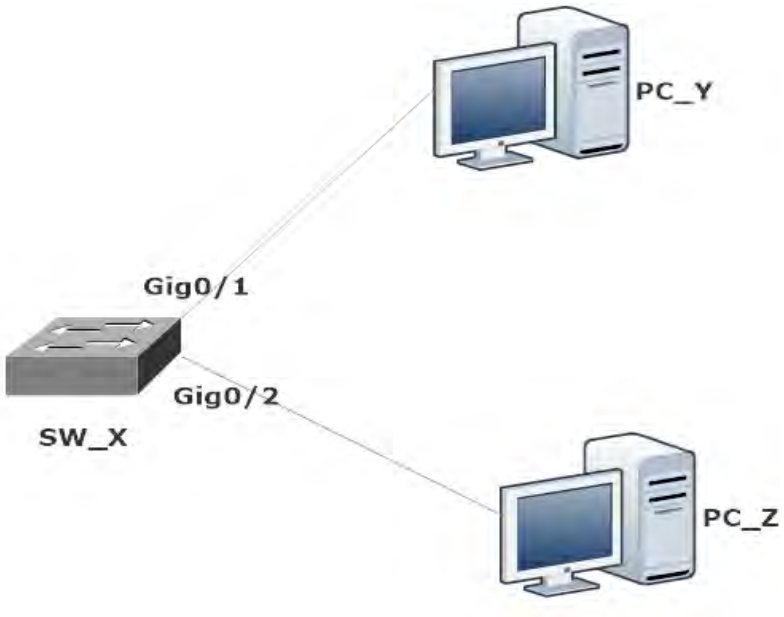
(e) Configure the system to require a minimum 8-character password. (4 marks)

(f) Test connectivity between Comp_A and Router_1. (2 marks)

Save "Question 21" document and upload. **(Total: 20 marks)**

22. Create a word processor document named "Question 22" and use the document to save solution to questions (a) to (e) below.

Using GNS3 or packet tracer, configure the topology as shown below:




| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| SW-X | VLAN | 192.168.1.1 | 255.255.255.0 |
| PC-Y | NIC | 192.168.1.2 | 255.255.255.0 |
| PC-Z | NIC | 192.168.1.3 | 255.255.255.0 |

**Required**

(a) Configure the intermediary and end device with appropriate IP address and test connectivity between:

(i) PC_Y to PC-Z. (2 marks)

(ii) SW_X to PC_Z. (2 marks)

(b) On the switch, assign $kas2024* as the console password, configure sessions to disconnect after four minutes of inactivity and enable login. (6 marks)

(c) On the switch, create a banner that warns anyone accessing the device that unauthorised access is prohibited. (3 marks)

(d) Using the switch, configure local authentication for remote login using Telnet application layer protocol. (4 marks)

(e) Using PC_Y, access the switch remotely. (3 marks)

Save "Question 22" document and upload. **(Total: 20 marks)**

23. Create a word processor document named "Question 23" and use the document to save solutions to questions (a) to (c) below.

(a) Use the appropriate utility to show connectivity to the following websites:

(i) www.altavista.com (3 marks)

(ii) www.yahoomail.com (3 marks)

(iii) www.youtube.com (3 marks)

(b) Use the appropriate command to:

(i) Get IP address for the website www.youtube.com (3 marks)

(ii) View the domain name server for the website www.yahoomail.com (3 marks)

(iii) View all available records for the website www.altavista.com (3 marks)

(c) Use the appropriate command to display information related to network connections, routing tables and interface statistics. (2 marks)

Save "Question 23" document and upload. **(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 22 April 2024. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Wireshark**
- **Packet tracer/GNS3**

**SECTION I (40 MARKS)**



1. What's the name of a device that can be used to link several computers together in a local area network (LAN)? (2 marks)

2. Which networking device is capable of routing packets across networks and also filtering local area network traffic? (2 marks)

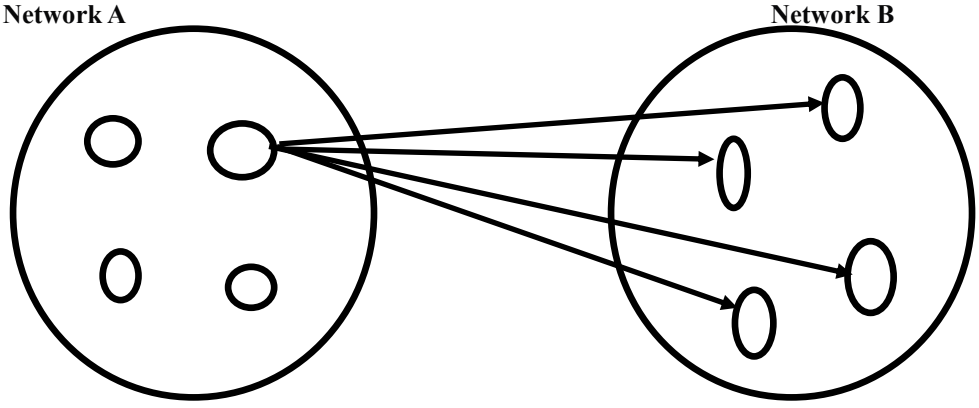
3. Name the organisation's private network that connects to third parties like vendors, customers and partners in a secure and controlled way. (2 marks)

4. The traffic control mechanisms that seek to either differentiate performance based on application or network-operator requirements or provide predictable or guaranteed performance to applications, sessions or traffic aggregates is known as? (2 marks)

5. The following are advantages of a transmission medium:
   - It is a very high-speed transmission with a large bandwidth.
   - It is also very cheap and simple to create.
   - It provides a wireless connection between two systems and there is no license needed to facilitate it.

   Identify the transmission medium discussed above. (2 marks)

6. Identify the type of casting as shown in the figure below: (2 marks)



7. Which feature or characteristic in operating systems enables computers to self-configure an IP address and subnet mask automatically when their Dynamic Host Configuration Protocol (DHCP) server is not reachable? (2 marks)

8. Which upper level layer receives bits from the receiving device's physical layer? (2 marks)

9. Identify the type of copper media used in networking below. (2 marks)

10. A book publisher's file server is receiving a single chapter document that an author is uploading from a personal computer. What role is the personal computer assuming in this network model? (2 marks)

11. An IPv4 address must be requested by a wireless host. What type of protocol would be applied in order to handle the request? (2 marks)

12. A communication paradigm in computer networks where data is sent from one sender to multiple receivers simultaneously is known as? (2 marks)

13. Which gadget transforms digital data from a computer into analog signals for transmission over telephone lines? (2 marks)

14. What component of a network facilitates communication between devices by giving each one a unique identity? (2 marks)

15. PC-A is assigned the IPv4 address 192.168.10.50 with the subnet mask 255.255.255.0. What is PC-A's network address? (2 marks)

16. A widely used protocol on the Internet for converting domain names that are readable by humans into IP addresses is called? (2 marks)

17. Which design principle reduces network congestion and boosts performance by breaking a network into smaller, easier-to-manage segments? (2 marks)

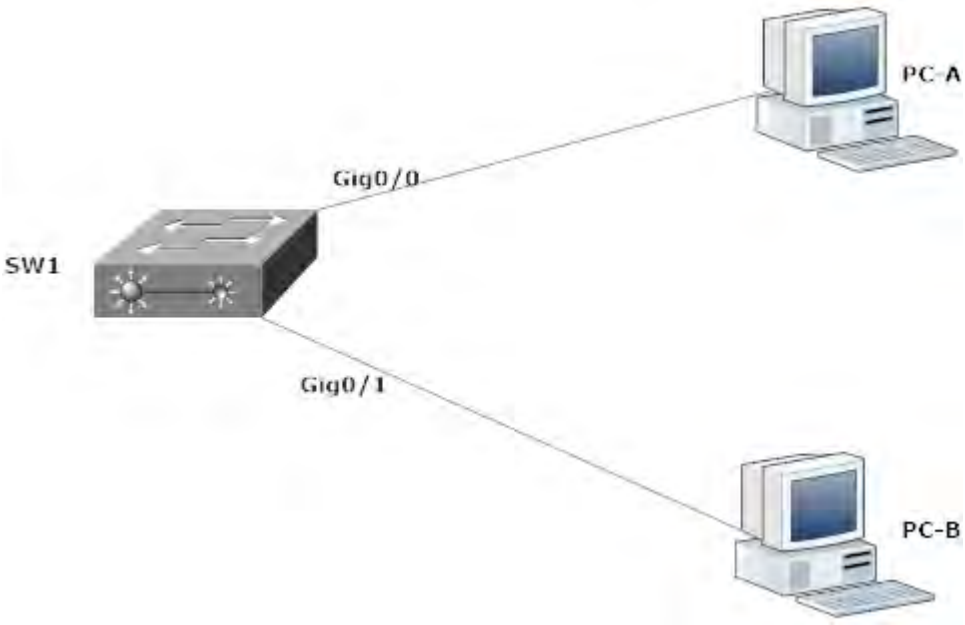
18. With reference to the OSI model, which layer is responsible for establishing, maintaining and terminating connections? (2 marks)

19. For a subnet with 14 host addresses, what is the subnet mask length in CIDR notation? (2 marks)

20. The type of a network setup where each computer and network device is interconnected with one another is known as? (2 marks)

## SECTION II (60 MARKS)

21. Create a word processor document called "Question 21" and use it to save captured screenshot of your findings to questions (a) to (d) below:




| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| SW1 | VLAN 1 | 192.168.0.1 | 255.255.255.0 |
| PC-A | NIC | 192.168.0.2 | 255.255.255.0 |
| PC-B | NIC | 192.168.0.3 | 255.255.255.0 |



**Required**

(a) Using an appropriate network simulator configure the intermediary and end devices with the appropriate IP addresses shown on the above table:

(i) **SW1** (4 marks)

(ii) **PC-A** (2 marks)

(iii) **PC-B** (2 marks)

(b) Create a warning banner on the switch as follows: (4 marks)

"*CAUTION: Unauthorised or improper use of this Switch may result in network disruptions, security breaches and violation of organisational policies. Read and adhere to the guidelines shared through the mail*"

(c) Use an enhanced version of the standard ping with a Repeat count of 100 to test the connection between the Switch and PC-A. (4 marks)

(d) Use appropriate commands to prevent console messages from interrupting command entry and avoid repetitive logins. (4 marks)

Save "Question 21" and upload.

**(Total: 20 marks)**

22. Create a word processor document called "Question 22" and use it to save captured screenshot of your solutions to questions (a) to (e) below:


| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| R1 | Gig0/0/0 | 172.16.10.1 | 255.255.255.252 |
| PC-1 | NIC | 172.16.10.2 | 255.255.255.252 |

**Required**

(a) Configure the intermediary and end device shown with the appropriate IP addresses as given on the above table:

(i) R1 (3 marks)

(ii) PC-1 (2 marks)

(b) Use appropriate command utility on the router to display a summary of the IP configuration and status of all interfaces. (2 marks)

(c) Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were hostnames. (3 marks)

(d) Configure the router to be accessed remotely using SSH (Secure Shell). (6 marks)

(e) Access the Router Remotely from the PC. (4 marks)

Save "Question 22" and upload.

**(Total: 20 marks)**



23. Create a word processor document called "Question 23" and use it to save captured screenshot of your solutions to questions (a) to (e) below:

(a) Use appropriate utility to query DNS (Domain Name System) to obtain IP address mapping of www.gmail.com. (3 marks)

(b) Use appropriate command to provide information about network latency and path information for www.gmail.com. (3 marks)

(c) Use appropriate command utility to display IP-to-Physical address translation tables. (3 marks)

(d) Use appropriate command utility to display NetBIOS over TCP/IP information for both local and remote Computers. (3 marks)

(e) You are provided with the following networking tools. Identify each tool and state its function as used in setting up a network:

(i)

(2 marks)

(ii)

(2 marks)

(iii)

(2 marks)

(iv)


(2 marks)



Save "Question 23" and upload.

**(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 4 December 2023. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Simulator such as Wireshark**
- **Packet tracer/GNS3**



**SECTION I (40 MARKS)**

1. You are tasked to design a network infrastructure for a large corporation. The company is looking for an efficient and scalable design. Which network design model, characterised by the division of the network into Core, Distribution and Access layers, would you recommend for this scenario? (2 marks)

2. The Network provides services to allow end devices exchange data across networks. The protocol regarded as the principle of network layer communication is known as _____. (2 marks)

3. In a network infrastructure optimisation project, you encounter a situation where large data packets need to be transmitted across a network that imposes limitations on packet sizes. Which technique is used to divide these large data packets into smaller pieces to ensure smoother transmission? (2 marks)

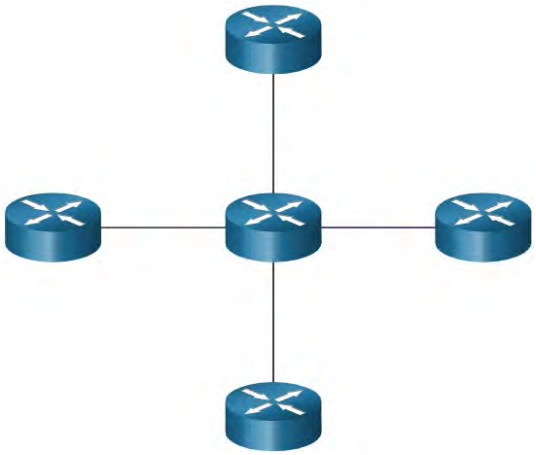
4. Which type of network covers a limited geographic area, typically a university, business park or large institution? (2 marks)

5. Which network media connects antennas to wireless devices and can be combined with fiber-optic cabling to allow for two-way data transmission. (2 marks)

6. In a network administration task, you need to convert the IPv4 address 172.16.32.1 into its binary notation. What is the binary representation of the IP address after conversion? (2 marks)

7. What is the term given to the data link sublayer that communicates between the networking software at the upper layers and the device hardware at the lower layers? (2 marks)

8. The diagram below depicts the WAN version of the _____topology, in which a central site connects branch sites via point-to-point links. (2 marks)



9. _____ is used to divide an IP network into sub networks, determines which portion of the IP address is the network identifier and which is the host identifier. (marks)

10. The TCP/IP model is a four-layer model that categorises network communications into four distinct groups. A stateless best-effort delivery transport layer protocol is known as _____. (2 marks)

11. State the name given to the networking device used to connect two or more network segments or LANs to extend the network and filter traffic between segments based on Ethernet hardware addresses. (2 marks)

12. The type of network cable used in a computer network to connect two devices of the same type, such as two computers or two switches to each other is called? (2 marks)

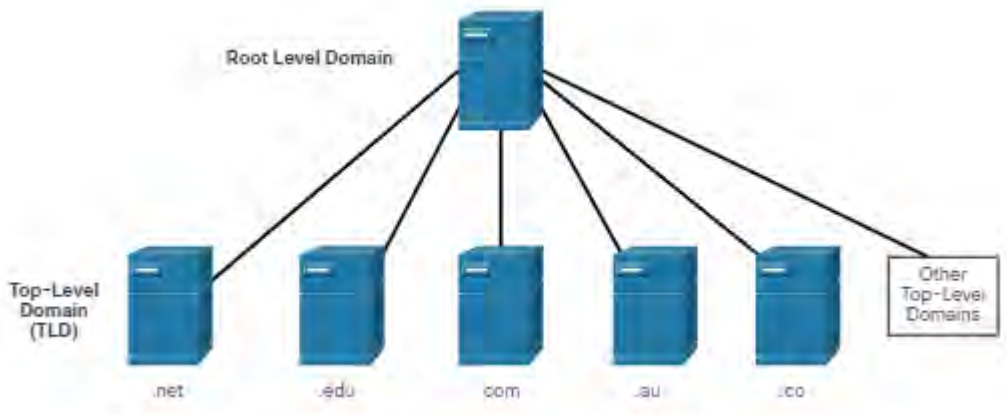


13. In a multimedia content development project, you are tasked with ensuring the proper integration of various file formats into your application. The formats in question are MKV, GIF and JPG. Your team is discussing the network layers associated with these file standards. Identify the OSI layer to which these formats are primarily associated. (2 marks)

14. As part of a network architecture redesign for an organisation, you are tasked with implementing a network device that enhances security, provides anonymity and offers caching services. That network device is referred to as _____. (2 marks)

15. Which type of applications distributes the roles of both service providers and consumers across the network, allowing participants to interact directly with each other? (2 marks)

16. Which protocol uses a hierarchical system to create a database to provide name resolution as shown below?



17. Which method makes use of native IPv6 connectivity? (2 marks)

18. John Njanee was given network address 172.16.10.0/24.What will be the last unicast address to be assigned to devices that belong to that network? (2 marks)

19. The unique identifier assigned to each Network Interface Card (NIC) in a device, such as a computer, smartphone or printer consists of 12 hexadecimal characters called _____. (2 marks)

20. Which Ethernet device operates at the OSI model's Data Link Layer and uses MAC addresses to make forwarding choices by constructing a MAC address table to keep track of which devices are connected to each port? (2 marks)

**SECTION II – (60 MARKS)**

21. Create a word processor document called Question 21 and use it to save captured screenshot of your findings to questions (a) to (b) below:

**Required:**

(a) (i) Use a relevant Command Prompt tool to check the functionality of the Network Interface Card (NIC) on your computer. Capture and save the screenshot displaying the result. (3 marks)

(ii) Configure your PC to allow remote assistance and set the maximum time the invitation can remain open to 30 minutes. Capture and save the screenshot displaying the result showing the steps. (3 marks)

(iii) Configure your PC to allow it see other network computers and devices and is also visible by other computers in the network. (3 marks)

(b) The Domain Name System (DNS) is a technology in computer networks that functions as a distributed, hierarchical database, allowing users to access websites and other resources by using easily remembered domain names rather than numerical IP addresses.

**Required:**

(i) Use appropriate command utility to clear the DNS resolver cache on your local computer. (2 marks)

(ii) Use appropriate command utility to release the current IP address and related network settings assigned to a network adapter. (3 marks)

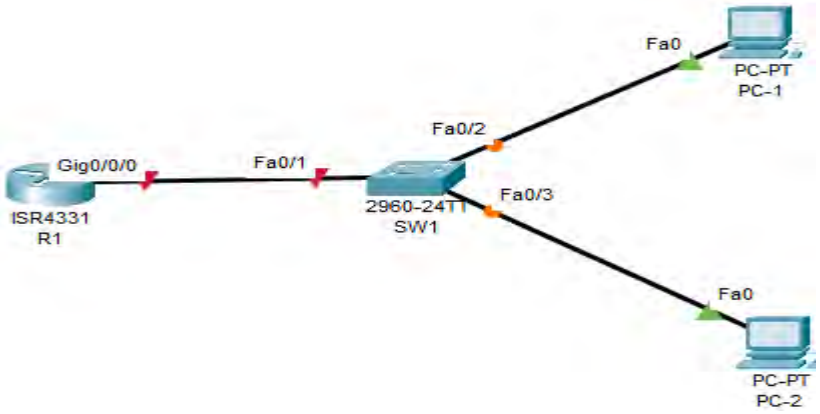
(iii) Use appropriate command utility to request a new IP address lease from a DHCP server. (3 marks)

(iv) Use appropriate command utility to resolve the IP address associated with domain name, www.google.com (3 marks)

Save Question 21 and upload**.**

**(Total: 20 marks)**

22. Create a word processor document called Question 22 and use it to save captured screenshot of your solutions to questions (a) to (d) below:
Using an appropriate simulator, configure the topology as shown below.




| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| R1 | Gig0/0/0 | 192.168.100.1 | 255.255.255.0 |
| SW1 | VLAN 1 | 192.168.100.2 | 255.255.255.0 |
| PC-1 | NIC | 192.168.100.3 | 255.255.255.0 |
| PC-2 | NIC | 192.168.100.4 | 255.255.255.0 |

**Required:**

(a) Configure the following intermediary and end devices with the appropriate IP addresses shown on the above table.

(i) R1 (3 marks)

(ii) SW1 (3 marks)

(iii) PC-1 (2 marks)

(iv) PC-2 (2 marks)

(b) Capture a screenshot showing connectivity between the R1 and SW1. (4 marks)

(c) Using appropriate command utility, display OSI layer I and II status of your configuration for the switch. (4 marks)

(d) State the network address to which the useable addresses configured above belong. (2 marks)

Save question 22 and upload**.**

**(Total: 20 marks)**

23. Create a word processor document called Question 23 and use it to save captured screenshot of your solutions to questions (a) to (e) below:
Using the topology in question "22" to answer questions (a) to (e).

(a) Display Content Addressable Memory table for the Ethernet network created above? (4 marks)

(b) Display the IOS image of the Switch. (4 marks)

(c) Display contents of logging buffers. (4 marks)

(d) Display Link Layer Discovery Protocol status of the switch. (6 marks)

(e) State two types of communication modes as used in networking. (2 marks)

Save question 23 and upload**.**

**(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINISTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 21 August 2023. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two (2) sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.**

**Required Resources:**
1. **A computer**
2. **Internet connection**
3. **Simulator such as Wireshark**
4. **Packet tracer/GNS3**

**SECTION I (40 MARKS)**

1. The diagram below shows a wired connection to the Wireless Router:



With reference to the diagram above, what is the name given to the hardware component that uses the OSI model to send signals at the physical layer, transmit data packets at the network layer and operate as an interface at the TCP/IP layer? (2 marks)

2. A protocol data unit (PDU) is the basic unit of exchange between entities that communicate using a specified networking protocol. What PDU is received by the physical layer for encoding and transmission? (2 marks)

3. ABC Ltd. has modified its network to allow users to access network resources from their personal laptops and smart phones. What is the name of this networking trend? (2 marks)

4. The feature that assigns a unique IP address from the range of 169.254.0.1 to 169.254.255.254 to the computer in a computer network is called_____. (2 marks)

5. Internetworking is the practice of interconnecting multiple computer networks. What is the name given to a device that connects end devices in a network to each other, enabling them to talk by exchanging data packets? (2 marks)

6. What is the name given to a private network that enterprises use to provide trusted third parties with a secure and controlled access to business information or operations? (2 marks)

7. State the type of media shown below: (2 marks)

8. What is the name given to an address that is used when one wants to reach all devices on the IPv4 network? (2 marks)

9. State the conceptual framework that defines how network protocols should be structured and interact? (2 marks)

10. A network protocol is an established set of rules that determine how data is transmitted between different devices in the same network. Which protocol provides feedback from the destination host to the source host about errors in packet delivery? (2 marks)

11. Which Network access layer protocol connects an ever-changing Internet Protocol (IP) address to a fixed physical machine address in a Local Area Network (LAN)? (2 marks)

12. What is the name given to a scenario where one Network provider delivers networking services for voice, data, and video in a single network, instead of providing a separate network for each of these services? (2 marks)

13. Which layer of the OSI reference model allows users to access files, such as from cloud-based storage or a database? (2 marks)

14. The communication technique used in computer networks to control and regulate data transmission between devices so as to prevent multiple devices from attempting to transmit data simultaneously to avoid collisions is called? (2 marks)

15. The process of distributing network traffic across multiple servers or paths to optimise resource utilisation, improve performance, and ensure high availability is called? (2 marks)

16. What is the name given to an internal address that routes back to the local system for both IPv4 and IPv6 routed protocols? (2 marks)

17. Media Access Control address is a unique identifier assigned to a network interface controller of a network device. State the networking command that you would use to display the MAC address of your computer. (2 marks)

18. Assuming you are given a unicast address of 192.168.10.33/27.What would be the Network address? (2 marks)

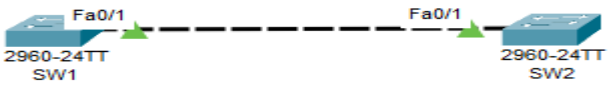
19. Protocols such as SMTP, FTP, and HTTP that do not have real time communication requirements and can tolerate some data loss while minimising protocol overhead are associated with which protocol of the Transport layer? (2 marks)

20. _____ is a measure of the data transfer rate or capacity of a given network. (2 marks)

## SECTION II – (60 MARKS)

21. Create a word processor document called **Question 21** and use it to save solutions to questions (a) to (e) below:

Using an appropriate simulator, configure the topology as shown below:




**Required:**

(a) Capture a screenshot displaying hostname for SW1 and SW2. (4 marks)

(b) Using appropriate command, display the IOS image file of SW1. (2 marks)

(c) Using appropriate command on SW2, display advertisement and discovery of network services. (6 marks)

(d) Use appropriate command utility to display the mac-address table on SW2. (4 marks)

(e) Use appropriate command utility on SW1 to display the status of Fast Ethernet 0/1 (4 marks)



Save question 21 and upload.

**(Total: 20 marks)**

22. Create a word processor document called **Question 22** and use it to save solutions to questions (i) to (iv) below:

Using the topology below, configure the following unicast address to the VLAN interface of the switches (SW1 and SW2) as shown in Table1 below. Use the provided simulator.

**Topology**

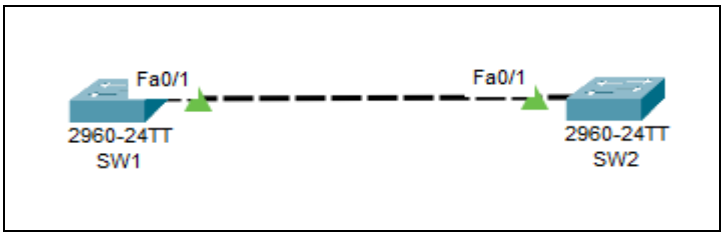



**Table1**

| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| SW1 | VLAN 1 | 10.0.0.1 | 255.255.255.0 |
| SW2 | VLAN 1 | 10.0.0.2 | 255.255.255.0 |

**Required**
Console into the Router and perform the following:

(i) Capture a screenshot showing IP configuration for SW1 and SW2. (6 marks)

(ii) Capture a screenshot showing connectivity between the SW1 and SW2. (4 marks)

(iii) Using appropriate command utility, display Maximum transmission unit, bandwidth and delay values for VLAN 1 on any of the two switches. (6 marks)

(iv) Capture a screenshot showing Layer I and II status of the OSI model on any of the two switches. (4 marks)

Save Question 22 document and upload.

**(Total: 20 marks)**

23. Create a word processor document called Question 23 and use it to save solutions to questions (i) to (iv) below:

Use the topology in Question 22 above to answer the following questions:

(i) Capture a screenshot showing configuration of SW1 and SW2 for remote access using secure shell and Telnet as application layer protocols. (12 marks)

(ii) From SW1, access SW2 remotely using Telnet. (4 marks)

(iii) From SW2, display Network and Datalink layer addresses. (4 marks)

Save Question 23 document and upload.

**(Total:20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINSTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 24 April 2023. Morning Paper.** **Time Allowed: 3 hours.**

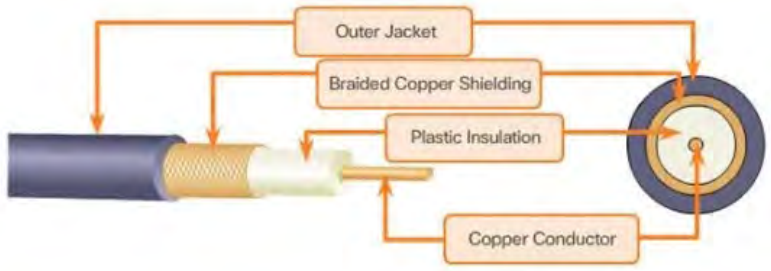
**Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Simulator such as Wireshark**
- **Packet tracer/GNS3**

**SECTION I (40 MARKS)**

1. The diagram below shows the image of coaxial cable. Which part is used to transmit the electronic signals?






(2 marks)

2. What characteristics of the network ensures a given set of technologies that work on a network guarantee its ability to dependably run high-priority applications and traffic under limited network capacity? (2 marks)

3. State the name given to a 32-bit number used to divide an IP address into network and host portions. (2 marks)

4. Data communication modes refer to the ways in which data is transmitted between devices. What mode of communication is characterised by one device only sending data, and the other device can only receiving data. (2 marks)

5. The value that is used to determine the best path to the destination network is known as? (2 marks)

6. The most common type of communication media used in local area network (LAN) technology is known as? (2 marks)

7. The simple file transfer protocol generally used for automated transfer of configuration or boot files between machines in a local environment is known as? (2 marks)

8. Internet Protocol (IP) address is a unique address that identifies a device on the internet or a local network. Name the type of address assigned to a set of interfaces that typically belongs to different nodes? (2 marks)

9. A recently hired junior officer at a telecommunication company sends a request for a webpage to a web server. Which protocol takes the packet from Internet Protocol (IP) and formats it for transmission? (2 marks)

10. A user calls the help desk stating that they can't get on the Internet. You have them try to connect to a website via the URL and the IP address. The IP address works, but the URL doesn't. What network service is likely the problem? (2 marks)

11. Which layer of the OSI model can a network administrator use to identify whether the signals generated by the server Network Interface card (NIC) is either distorted or usable. (2 marks)

12. Which data link layer media access control is used by 802.11-based wireless networks? (2 marks)

13. Miss Jane recently set-up a cosmetic shop. She wanted to connect her Personal Computer (PC) to a Switch. Which type of unshielded twisted pair (UTP) cable can be used to make the connection? (2 marks)

14. Compute the dotted decimal representation of the IPv4 address which is represented as the binary string 10101100 00010000 00001010 00000001. (2 marks)

15. Which protocol is used as the best way to push network, configuration setting across the network to a large number of computers at boot time. (2 marks)

16. Internet Protocol (IP) is concerned with getting data from one node to another on a network. In view of the above, how many bits are in an IPv6 address? (2 marks)

17. Which intermediary device switches Data link layer of the OSI model like an ordinary network switch and provides extra functions on higher OSI layers? (2 marks)

18. You have an interface on a router with the IP address of 192.168.192.10/29. Including the router interface, how many hosts can have IP addresses on the LAN attached to the router interface? (2 marks)

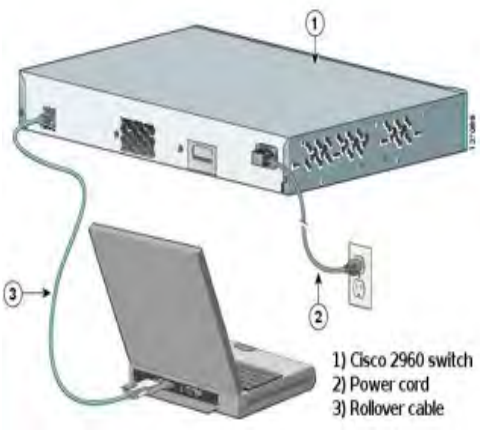
19. Which field of the IP packet contains a value that represents the number of bits in a transmission message and can as well be used to detect high-level errors within data transmissions? (2 marks)

20. The amount of time it takes for data to travel from one point on a network to another, usually measured in milliseconds is referred to as? (2 marks)



**SECTION II (60 MARKS)**

21. Using an appropriate simulator, configure the topology as shown below and capture screenshot of your configuration in word document. Save the answers in a word document named “Question 21”.




**Required:**

(i) Display the IOS version for your switch**.** (4 marks)

(ii) Identify the configuration register value. (2 marks)

(iii) Set the clock switch to display the current date and time. (4 marks)

(iv) Use appropriate command utility to verify that the clock setting has updated. (2 marks)

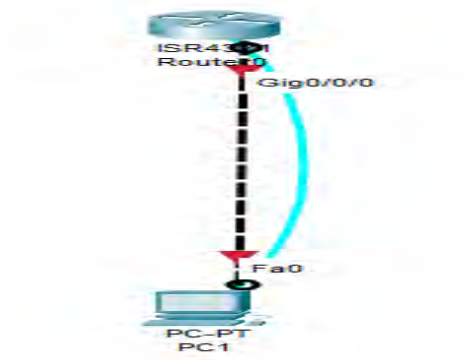
(v) Use appropriate command utility to verify summary of the status, protocol and IP addresses of your switch interfaces. (4 marks)

(vi) Use appropriate command utility to display the IOS image file. (4 marks)

Save "Question 21" and upload.

**(Total: 20 marks)**

22. Using the appropriate simulator, configure the topology as shown below and capture screenshot of your configuration in word document named "Question 22".






| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| Router | Gig0/0/0 | 172.16.10.1 | 255.255.255.0 |
| PC | NIC | 172.16.10.2 | 255.255.255.0 |

**Required:**

Console into the Router and perform the following:

(i) Capture a screenshot showing IP configuration for the router. (4 marks)

(ii) Capture a screenshot showing IP configuration for the PC. (2 marks)

(iii) Capture a screenshot showing connectivity between the Router and PC. (4 marks)

(iv) Use appropriate command utility to display the physical address of the gateway from the PC. (4 marks)

(v) Capture a screenshot showing Configuration of connecting securely to the Router. (6 marks)

Save "Question 22" and upload.

**(Total: 20 marks)**

23. Using the topology undertaken in question 22, answer the following questions and capture screenshot of your configuration in word document named Question 23.

(i) Using appropriate command on the router, display the MAC address of the router G0/0/0 Interface. (6 marks)

(ii) Display Layer 2 addresses on the router (4 marks)

(iii) Display layer 3 address on the router. (4 marks)

(iv) From the router, use extended ping with repeat count of 50 and target IP address of 172.16.10.2. (6 marks)

Save "Question 23" document and upload.

**(Total: 20 marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEMS ADMINSTRATION (DCNSA)**

**LEVE L II**

**COMPUTER NETWORKING**

**MONDAY: 5 December 2022. Morning Paper.** **Time Allowed: 3 hours.**

**Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions of two (2) marks each. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.**

**Required Resources:**

- **A computer**
- **Internet connection**
- **Simulator such as Wireshark**
- **Packet tracer/GNS3**

**SECTION I (40 MARKS)**

1. What is the name given to a circuit board, installed in a computer that provides a dedicated network connection to a computer? (2 marks)

2. The arrangement of network devices and nodes to form a physical structure is known to as? (2 marks)

3. Miss Kerrow, an intern has been instructed to setup a network for newly formed Procurement department. What will be the name given for all computers connected to the network that participate directly in network communication? (2 marks)

4. The network media that is used to transmit data when encoded as pulses of light is referred to as? (2 marks)

5. What is the name of the network utility used by Internet Control Message Protocol (ICMP) to report back information on network connectivity and the speed of data relay between a host and a destination computer? (2 marks)

6. A type of communication that sends a message to a group of host destination simultaneously is known as? (2 marks)

7. Which type of a network has dedicated high-speed network that makes storage devices accessible to servers by attaching storage directly to an operating system? (2 marks)

8. The process that is used to place one message inside another message from Host A to Host B is known as? (2 marks)

9. Mr. Lido a newly hired network administrator was troubleshooting connectivity issues on a workstation. With the use of a tester, the administrator was able to notice the signals generated by the server Network Interface Card (NIC) are distorted. Which layer of the OSI Model would this error be categorised? (2 marks)

10. What is the name given to a cable that is used to connect a Host serial port to a Router console port? (2 marks)

11. The measure of capacity of a network medium to carry and move data between two points on the network over a specific period of time is known as? (2 marks)

12. The deterioration of the network signals as it travels along copper cabling is referred to as? (2 marks)

13. Mrs. Lehma a network administrator for a corporation decided to create subnets out of 192.168.10.0/24 using /27 mask. What would be the equal-sized subnet created? (2 marks)

14. _____lists the destination physical address, VLAN ID and port number associated with a given address. (2 marks)

15. The prefix length is the number of consecutive 1s in the subnet mask. What is the prefix length notation for the subnet mask 255.255.255.252? **(**2 marks)

16. The process that allows a network technician identify the network address from the IP address and the network mask is referred to as? (2 marks)

17. The method used in a TCP/IP network to create a connection between a local host/client and server is called? (2 marks)

18. Which port number in a segment header is used to keep track of multiple conversations between devices? **(**2 marks**)**

19. What is the standard communication protocol used for the transfer of computer files from a server to a client on a computer network? (2 marks)

20. The following are advantages of a certain type of network:
- Reduces amount physical wires required.
- Reduces the value of ownership.
- Easier to add or remove workstation
- Provides high rate thanks to small area coverage

Identify this type of network as used in computer networks. (2 marks**)**

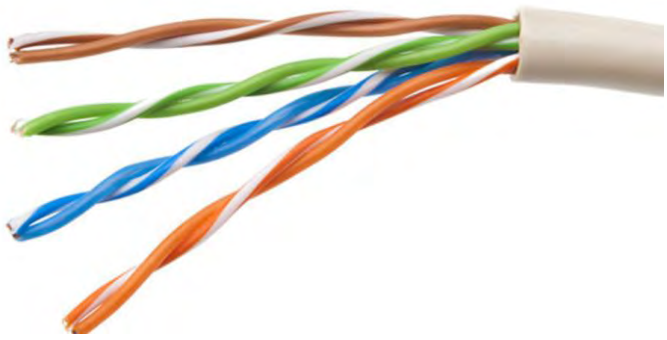


**SECTION II (60 MARKS)**

**Required Resources**

Internet Connection
Computer (PC/laptop)
Simulator such as Wireshark

21. Use the diagram shown below to correctly order the wire colors to a TIA/EIA cable pinout of T568A and T568B standard where appropriate.



**Required:**

(i) List the cable pinout for **Ethernet Straight-through.** (8 marks)

(ii) List the cable pinout for Ethernet Crossover (8 marks)

(iii) State application usage using appropriate examples for Ethernet straight-through and Crossover cables. (4 marks)

**(Total: 20 Marks)**

22. Create a word document named "Topology" and use it to save answers to questions (i) to (vi) below:

Using appropriate simulator, configure the topology as shown below:


| | Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|---|
| (i) | SW-A | VLAN | 192.168.10.1 | 255.255.255.0 |
| (ii) | PC-A | NIC | 192.168.10.2 | 255.255.255.0 |

Console into the switch and perform the following:

(i) Capture a screenshot showing appropriate name for the switch. (2 marks)

(ii) Set a warning banner shown below: (4 marks)

Capture a screenshot to demonstrate how you have performed the above task.

(iii) Capture a screenshot displaying unicast IPv4 addresses as shown in the table. (4 marks)

(iv) Capture a screenshot showing the way to disable DNS lookup. (4 marks)

(v) Capture a screenshot displaying Configuration of encrypted privileged execution password. (4 marks)

(vi) Capture a screenshot showing connectivity between PC-A and SW-A. (2 marks)

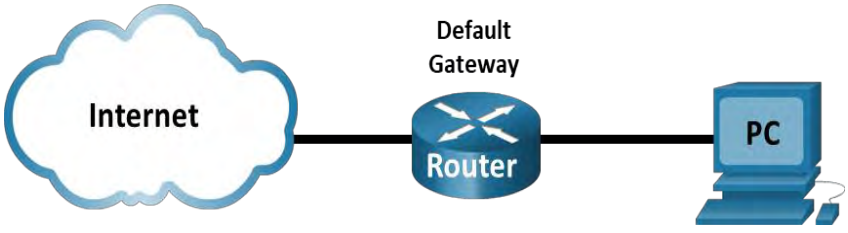
Upload Topology document.

**(Total: 20 Marks)**



23. Write a word document named "Connectivity" and use it to save answers to Questions (a) to (c) below:

Using appropriate simulator, set up a topology as shown below:




**Required:**

(a) Capture a screenshot showing connectivity to the following websites using command prompt/terminal of the PC:

(i) www.google.com (3 marks)

(ii) www.gmail.com (3 marks)

(iii) www.facebook.com (3 marks)

(b) Using a simulator such as Wireshark, list the source mac address of the following sites:

(i) www.google.com (3 marks)

(ii) www.gmail.com (3 marks)

(iii) www.facebook.com (3 marks)

(c) Highlight the two command utilities used to provide the network latency information. (2 marks)

Upload connectivity document.

**(Total: 20 Marks)**

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**DIPLOMA IN COMPUTER NETWORKS AND SYSTEM ADMINSTRATION (DCNSA)**

**LEVEL II**

**COMPUTER NETWORKING**

**MONDAY: 1 August 2022. Morning paper.** **Time Allowed: 3 hours.**

**This paper has two sections. SECTION I has twenty (20) short response questions. SECTION II has three practical questions of sixty (60) marks. All questions are compulsory. Marks allocated to each question are shown at the end of the question.**

**SECTION I**

1. What is the name of an electronic device that allows communication between computers connected through Local Area Network using Internet Protocol (IP)? (2 marks)

2. _____is a device that creates a wireless local area network, or WLAN, usually in an office or large building? (2 marks)

3. What is the name given to a cable Mr. Liam can use to connect Fast Ethernet port on a PC to a switch port in Local Area Network? (2 marks)

4. _____carry very large amounts of data in backbone networks and are used extensively by telephone companies. (2 marks)



5. What is the name given to a network carrier transmission protocol that is attributed to the following features? (2 marks)

   (i) Effective after a collision
   (ii) Used in wired networks
   (iii) Reduces Recovery time

6. _____ is a network topology in which each network component is physically connected to a central node such as a router, hub or switch. (2 marks)

7. What is the name given to all computers connected to a network that participate directly in network communication? (2 marks)

8. _____is a type of network topology that lets you see which end devices are connected to which intermediary devices such as routers and the type of media used. (2 marks)

9. Give the name of the cable shown in the diagram below. (2 marks)

10. The layer of the OSI Model that defines services to segments and reassembles data for individual communication between end devices is known as_____. (2 marks)

11. Miss Rahma is sending request to a web server to access her gmail account. From her perspective as the client, what would be the correct order of the protocol stack that is used to prepare the request for transmission? (2 marks)

12. Identify the number of valid host addresses available on IPv4 subnet that is configured with /28 mask. (2 marks)

13. _____message type is used by an HTTP client to request data from a preferred web server. (2 marks)

14. _____ is a set of rules that govern how devices exchange data across networks. (2 marks)

15. A newly hired Network technician has been tasked to ensure the wireless hosts from one of the conference hall request an IPv4 address dynamically. What protocol would be used to process the request? (2 marks)

16. _____is an information technology (IT) infrastructure that allows two/more computer systems to connect and share resources without a separate server. (2 marks)

17. Which protocol downloads a copy of email messages leaving the original on the server? (2 marks)

18. _____ is used to configure and identify the hardware in a system such as the hard drive, floppy drive, optical drive, CPU, and memory. (2 marks)

19. When two end devices communicate with each other in the network, which identifier is used at the layer two of the OSI model to uniquely identify an Ethernet device? (2 marks)

20. Contention-based access on a Wireless Local Area Network (WLAN) is managed by which method? (2 marks)



## SECTION II

21. The TIA/EIA has specified unshielded twisted pair (UTP) cabling standards for use in LAN cabling environments. TIA/EIA 568-A and 568-B stipulates the commercial cabling standards for LAN installations; these are the standards most commonly used in LAN cabling for organizations and they determine which color wire is used on each pin.

**Required:**
Use the table below to answer questions (i), (ii) and (iii) below.

| Pin Number | Pair Number | Wire Color | 10Base-T Signal<br>100Base-TX Signal |
|---|---|---|---|
| **1** | | | |
| **2** | | | |
| **3** | | | |
| **4** | | | |
| **5** | | | |
| **6** | | | |
| **7** | | | |
| **8** | | | |

(i) Identify the pair number for each pin number. (8 marks)

(ii) Identify the wire color for each pin number. (8 marks)

(iii) Name the status for 10 and 100 base-T signal for every pin number. (4 marks)

**(Total: 20 marks)**

22. Use appropriate simulator to configure the topology as shown below


**Required Resources**

- 2 PC
- Ethernet cable as shown in the topology

| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| PC-A | NIC | 172.16.10.1 | 255.255.255.0 |
| PC-B | NIC | 172.16.10.2 | 255.255.255.0 |

(i) Configure IP Address as shown in the topology. (4 marks)

(ii) From PC-B capture a screenshot displaying the TCP/IP network configuration values. (2 marks)

(iii) Capture screen showing connectivity between the two computers. (4 marks)

(iv) From PC-A use appropriate command utility to trace the path to PC-B. (2 marks)

(v) From PC-B use appropriate command utility to display routing table. (4 marks)

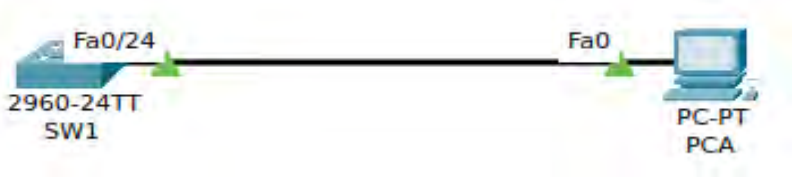
(vi) Capture a screenshot showing the mapping between domain name and IP address of the two PCs. (4 marks)

Upload the screenshots you have captured.

**(Total: 20 marks)**



23. Using appropriate simulator configure the topology as shown below.




**Required Resources**

- 1 Switch
- 1 PC
- Console cables to configure the IOS devices via the console ports
- Ethernet cables as shown in the topology

| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| SW1 | VLAN 1 | 192.168.100.1 | 255.255.255.0 |
| PCA | NIC | 192.168.100.10 | 255.255.255.0 |

(i) Enter global configuration mode and assign the switch hostname. (2 marks)
(ii) Secure privileged EXEC mode access using password kasneb. (4 marks)
(iii) Display a login banner as follows. (4 marks)

**********

ACCESS TO THE SWITCH WITHOUT EXPRESS PERMISSION IS NOT ALLOWED

**********

(i) Configure SW1 IP address for the switch . (4 marks)
(ii) Prevent unwanted DNS Lookup. (4 marks)
(iii) Test connectivity between the switch and the PC. (2 marks)

Upload screenshots to demonstrate how you have performed the above task.

**(Total: 20 marks)**

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