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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA (Integrated)

SEM: VI - THEORY EXAMINATION (2025 - 2026)

Subject: Computer Networks

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

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1. Attempt all parts:-

- (1.1) Which device operates at Layer 2 of the OSI model? CO1 K2 1
- (a) Router
- (b) Switch
- (c) Hub
- (d) Firewall
- (1.2) A hub functions at which OSI layer? CO1, K2 1
- (a) Physical
- (b) Data Link
- (c) Network
- (d) Transport
- (1.3) Which of the following is incorrect about hubs? CO2, K2 1
- (a) It does not have intelligence
- (b) It has routing tables
- (c) It uses broadcast messages
- (d) It has no IP address
- (1.4) DHCP (dynamic host configuration protocol) provides _____ to the client. 1
- [CO2 K1]
- (a) IP address
- (b) MAC address
- (c) Url
- (d) None of the mentioned

- (1.5) In which of the following, a person is constantly followed/chased by another person or group of several peoples? CO3,K2 1
- (a) Phishing
 - (b) Bulling
 - (c) Stalking
 - (d) Identity theft
- (1.6) Apply your understanding to identify which criteria a firewall uses to decide whether to allow or block network traffic. CO3,K3 1
- (a) Source code of the application
 - (b) Type of operating system used
 - (c) Predefined security rules and criteria
 - (d) The physical location of the device
- (1.7) Technology used in multilayer switches to forward packets based on IP addresses CO4,K2 1
- (a) MAC learning
 - (b) ARP
 - (c) IP routing
 - (d) VLAN tagging
- (1.8) Choose the switching method that reduces latency by forwarding frames as soon as destination address is read CO4,K3 1
- (a) Store-and-forward
 - (b) Fragment-free
 - (c) Cut-through
 - (d) Fast switching
- (1.9) Recall a critical role of the Core layer in a hierarchical design. CO5,K2 1
- (a) Packet filtering
 - (b) Reducing latency and providing fast transport
 - (c) Device authentication
 - (d) IP addressing
- (1.10) What is a "single point of failure" (SPOF)? CO5,K2 1
- (a) A non-critical component that is prone to failure.
 - (b) Any single device or connection that, if it fails, will take down the entire network or service
 - (c) A redundant path in the network
 - (d) A network bottleneck that reduces performance

2. Attempt all parts:-

- (2.1) Apply the concept of data flow modes by giving real-world examples of simplex, half-duplex, and full-duplex communication CO1,K3 2
- (2.2) Differentiate between Root Port and Designated Port in STP. CO2,K3 2
- (2.3) Explain different types of firewalls used in computer networks. CO3,K2 2
- (2.4) Discuss the types of messages used in BGP protocol. Explain their functions. 2

	CO4,K4	
(2.5)	Describe how VLANs contribute to better network design and segmentation.CO5,K2	2

SECTION-B 30

Answer any one of the following:-

(3.1)	Compare and contrast the Ring and Star network topologies. Which one is more suitable for modern-day LANs, and why? CO1,K4	6
(3.2)	Demonstrate the working of Address Resolution Protocol (ARP) in computer networks. How does ARP help in resolving an IP address to a MAC address? CO1,K3	6

Answer any one of the following:-

(3.3)	Illustrate the structure and function of a routing table using suitable examples. CO2,K3	6
(3.4)	justify the importance of VLAN routing in modern multi-department enterprises. CO2,K5	6

Answer any one of the following:-

(3.5)	Explain with examples how cybercrimes like phishing, identity theft, ransomware are applied. CO3,K3	6
(3.6)	Discuss the advantages of Device Hardening. CO3,K3	6

Answer any one of the following:-

(3.7)	Illustrate the primary benefit of using MPLS in a WAN network.CO4,K3	6
(3.8)	Analyze key QoS mechanisms used to manage network traffic effectively.CO4,K4	6

Answer any one of the following:-

(3.9)	Recommend appropriate wireless security methods for a small enterprise network. CO5,K5	6
(3.10)	Explain how MAC filtering can restrict unauthorized devices in a WLAN. CO5,K2	6

SECTION-C 50

4. Answer any one of the following:-

(4.1)	Analyze the TCP/IP model by comparing the functions of each layer, and evaluate how each layer contributes to effective network communication. Discuss any limitations or scenarios where the model may not be sufficient.CO1,K5	10
(4.2)	Evaluate the effectiveness of HTTP, FTP, and DNS in modern networking. Which of these protocols plays the most critical role in today's Internet usage, and why?CO1,K5	10

5. Answer any one of the following:-

(5.1)	Explain the steps of the DORA process and its role in DHCP operation. CO2,K2	10
(5.2)	Examine VLAN ACLs and their role in controlling inter-VLAN traffic. CO2,K4	10

6. Answer any one of the following:-

(6.1)	Analyze different types of network automation and explain impact. CO3,K4	10
(6.2)	An organization reports frequent phishing emails, several failed login attempts from unknown IP addresses, and sudden slowdowns in its web server performance.	10

Analyze these incidents to identify the possible security threats involved and explain them with suitable examples. CO3,K4

7. Answer any one of the following:-

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| (7.1) | Summarize the benefits of using multilayer switches in modern networks, particularly in terms of performance and scalability.CO4,K5 | 10 |
| (7.2) | Compare OSPF with other protocols like RIP and EIGRP, emphasizing aspects like convergence speed, scalability, and efficiency.CO4,K5 | 10 |

8. Answer any one of the following:-

- | | | |
|-------|---|----|
| (8.1) | Judge the advantages of virtual networks in modern day scenario. Discuss their contribution in networking. CO5,K5 | 10 |
| (8.2) | Judge the role of IoT in networking. How has it revolutionised modern day networking? CO5,K5 | 10 |

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