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

B.Tech

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

20

1. Attempt all parts:-

- (1.1) Following statement is correct about network latency?K3 CO1 1
- (a) The amount of data that can be transferred over a network at a given time.
 - (b) The number of packets that can be transmitted simultaneously over the network.
 - (c) The time it takes for a packet of data to travel from one point to another on the network.
 - (d) The amount of data that can be stored on a network device.
- (1.2) Type of transmission media uses copper wires to transmit data and is commonly used for cable television and broadband internet?K3 CO1 1
- (a) Optical fibre
 - (b) Coaxial Cable
 - (c) Twisted pair
 - (d) None of the above
- (1.3) Framing in data link layer ensures.(CO2,K2) 1
- (a) Data encryption
 - (b) Bit stream grouping into frames
 - (c) IP addressing
 - (d) Routing decisions
- (1.4) Error detection technique using redundancy bits is(CO2,K2) 1
- (a) ARP
 - (b) CRC
 - (c) DHCP
 - (d) FTP

- (1.5) Analyze the common cause of network congestion. (CO3, K3) 1
- (a) Low traffic
 - (b) Insufficient bandwidth
 - (c) Static routing
 - (d) Error-free transmission
- (1.6) Determine the retransmission time if a TCP sender does not receive an acknowledgment within the timeout interval of 5 seconds. (CO3, K3) 1
- (a) Immediately after sending
 - (b) After 2 seconds
 - (c) After 5 seconds
 - (d) After 10 seconds
- (1.7) Security-based connection is provided by the _____ layer. K3CO4 1
- (a) Application Layer
 - (b) Session Layer
 - (c) Network Layer
 - (d) Data Link Layer
- (1.8) Functions of the Transport Layer include _____. K2CO4 1
- (a) Error control and flow control
 - (b) Signal transmission
 - (c) Frame synchronization
 - (d) Routing and path selection
- (1.9) Identify the option that is not a key exchange algorithm. (K2, CO5) 1
- (a) Diffie-Hellman
 - (b) Elliptic Curve Cryptography
 - (c) RSA
 - (d) None of the above
- (1.10) In internet, the country domain section uses _____ country abbreviations. (K2, CO5) 1
- (a) Two-character
 - (b) Three-character
 - (c) Four-character
 - (d) Five-character

2. Attempt all parts:-

- (2.1) Define network topology in computer network. K32CO1 2
- (2.2) Suggest a suitable flow control technique for high-speed networks and justify your (CO2, K4) 2
- (2.3) Explain the criteria required for designing an effective and efficient network. (CO3, K2) 2
- (2.4) Summarize the duties of transport layer? K2CO4 2
- (2.5) Give the differences between SMTP and POP3. (K2, CO5) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Analyze the role of a Network Switch in a computer network and examine how it differs from a Network Hub in terms of functionality, performance, and data transmission mechanisms. K4 CO1 6
- (3.2) Analyze the key components of a computer network and examine the role and functionality of each component in enabling efficient communication.. K4 CO1 6

Answer any one of the following:-

- (3.3) Develop a a system to minimize collisions in a shared medium network using appropriate MAC protocols.(CO2,K6) 6
- (3.4) Elaborate about the concept of bit stuffing in framing.(CO2,K3) 6

Answer any one of the following:-

- (3.5) Compare classful and classless addressing based on address allocation, subnetting, and routing efficiency. (CO3, K3) 6
- (3.6) A university network experiences heavy traffic congestion during online examinations, causing packet loss and increased delay. Analyze different congestion control techniques that can be applied to manage and reduce network congestion effectively. (CO3, K4) 6

Answer any one of the following:-

- (3.7) Define algorithm. List down different types of Congestion Control algorithm.K2CO4 6
- (3.8) Explain the responsibilities of Stream, Packet and Raw Socket.K2 CO4 6

Answer any one of the following:-

- (3.9) Explain the advantages and disadvantages of File Transfer Protocol (FTP) in detail.(K2,CO5) 6
- (3.10) Discuss the RSA algorithm with reference to public key and private key, and apply its working in secure communication.(K3,CO5) 6

SECTION-C 50

4. Answer any one of the following:-

- (4.1) Explain the use of computer networks in different industries, such as healthcare, education, and finance. K2 CO1 10
- (4.2) Differentiate between circuit switching, packet switching and virtual circuit switching method . K4 CO1 10

5. Answer any one of the following:-

- (5.1) Explain the differences between a network switch and a bridge in terms of their working, features, and performance. Illustrate your answer with a suitable diagram and examples showing their use in a network.(CO2,K3) 10
- (5.2) Demonstrate the operation of Pure ALOHA and Slotted ALOHA protocols by applying their transmission principles. Use appropriate diagrams to show frame transmission, collision occurrence, and retransmission process.(CO2,K3) 10

6. Answer any one of the following:-

- (6.1) Analyze the subnetting process required to divide a Class C network into four equal subnets. (CO3, K4) 10

- (6.2) Analyze the IPv6 notation rules and apply them to compress a given IPv6 address efficiently. (CO3, K4) 10
7. Answer any one of the following:-
- (7.1) Analyze the concept of Quality of Service (QoS) in computer networks and examine how different Transport layer techniques contribute to improving QoS. K4 CO4 10
- (7.2) Explain Choke Packet with the help of diagram and example. K2 CO4 10
8. Answer any one of the following:-
- (8.1) Demonstrate the RSA algorithm using $P=3$, $Q=11$, and message $M=8$. (K3,CO5) 10
- (8.2) Explain the components of an email message and how they are transmitted across the internet.(K2,CO5) 10

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