Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S,FE) (FT/WP/S3PT) Examinations June 2026 (2019 Scheme)

Course Code: CST303
Course Name: COMPUTER NETWORKS

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) **Marks**

1	List any six uses of computer networks.	3
2	Draw the waveform for the bit sequence 10001110 using Differential Manchester encoding.	3
3	State the relationship between the number of data bits and redundant (parity) bits in a Hamming code. How many redundant bits are needed to encode a four-bit dataword using an even-parity Hamming code?	3
4	Draw the frame structure of HDLC and what is the purpose of each field.	3
5	State the Optimality Principle and explain the concept of a sink tree in routing.	3
6	Define source-based tree multicast routing and core-based tree multicast routing approaches.	3
7	List any three differences between IPv4 and IPv6.	3
8	A host is configured with IP address 172.16.45.200 and subnet mask 255.255.224.0. Determine the network address and the number of usable hosts.	3
9	What are the primitives used for a simple transport service. (Connection oriented)?	3
10	What isthe full form of MIME? What is the role of MIME?	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	With a neat diagram, explain the OSI reference model. Describe the functions of each layer.	8
	b)	What is the structure of Optical fiber and draw the structure of optical fiber.List the advantages (any four) and disadvantages (any two) of Optical fibercable.	6

OR

12 a) Compare the layers in OSI and TCP/TP reference model with necessary diagrams. Write five differences between OSI and TCP/TP reference model. 8

b) What are the propagation time and the transmission time for a 10MB message if bandwidth of the network is 2Mbps ? Assume that the distance between the sender and the receiver is 100000 Km and that light travels at 2 x 10^8 m/s. Calculate thebandwidth-delay product.*(Assume 1KB= 10^3 Byte & 1MB=10^3KB)* 6

Module -2

13 a) Explain the Go-Back-N and Selective Repeat sliding window protocols with timing diagrams. 8

b) A bit stream 1101011011 is to be transmitted using CRC with generator polynomial x^4+x+1. Show the transmitted bit string. 6

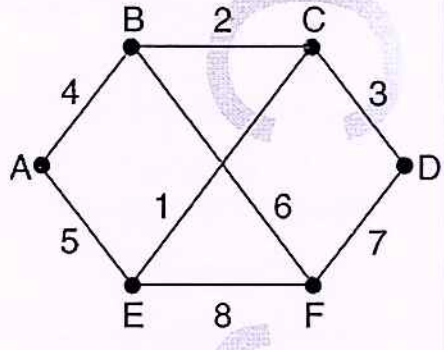
OR

14 a) Draw and explain IEEE 802.3 MAC frame structure. Also mention the minimum and maximum frame length 7

b) List different techniques for framing? Explain any two techniques with example. 7

Module -3

15 a) Consider the following subnet. Distance vector routing is used, and the following vectors have just come in to router F: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The new measured delays (from F) to B, D, and E, are 9, 6, and 4, respectively. What is F's new routing table? Give both the outgoing line to use and the expected delay. 7



b) What is the use of 'Hop-by-Hop Choke Packets'? What are the different ways to implement 'Hop-by-Hop Choke Packets' (use suitable diagrams). 7

OR

16 a) What is leaky bucket and token bucket algorithms, (with suitable diagram). How does each regulate traffic entering a network? 8

b) List any six differences between Distance Vector Routing and Link State Routing. 6

Module -4

17 a) Explain the working of the Address Resolution Protocol (ARP). Describe the ARP request-response cycle, ARP cache, and proxy ARP. 7

b) A company has been assigned the address block 192.168.10.0/24. It needs to create three subnets for different departments with the following requirements: Subnet A: 90 addresses, Subnet B: 30 addresses, Subnet C: 10 addresses. Find the number of addresses allocated for each subnet, subnet mask, and address range for each subnet.?How many addresses are left unassigned after the allocation? give its first address and last address. 7

OR

18 a) Explain the OSPF routing protocol. How does OSPF handle large networks using areas? List any three message types in OSPF. 8

b) Draw the IPv6 header format and what is the meaning of each field in the IPv6 header. 6

Module -5

19 a) Explain TCP connection management: three-way handshake for connection establishment and the four-segment exchange for connection termination. 8

b) Distinguish between iterative and recursive query resolution with suitable diagrams. 6

OR

20 a) Write any eight differences between UDP and TCP header format. 8

b) What is role of SNMP, SMI and MIB? 6

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