# **Question Paper**

Exam Date & Time: 22-May-2023 (02:30 PM - 05:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

#### FOURTH SEMESTER B.TECH. (INFORMATION TECHNOLOGY) EXAMINATIONS - MAY/JUNE 2023 SUBJECT: ICT/IT-2255 - COMPUTER NETWORK PROTOCOLS

#### Marks: 50

### Duration: 180 mins.

#### Answer all the questions.

1A)	Consider an organization with multiple departments with a block address as 172.16.0.0/17. The organization needs to have two subblocks with 30 and 110 addresses. Compute i) Subnet mask. ii) Total number of hosts on each block. iii) First address and last address of each block.	(5)
1B)	Consider a network in which 4 hops (point-to-point links) between two terminals nodes; Transmission rate 9600 bps on all links; 24 overhead bits [Header + Trailer] for each packet; 1ms per-hop signal propagation delay. 1 second Call set-up time for circuit switched connection across 4 hops. Message size 5000 bits, packet size 512 bits, all other parameters the same. Compute Total time incurred in Circuit and Packet Switching.	(3)
1C)	A router receives a packet with the destination address 201.24.67.32. Show how the router finds the network address of the packet.	(2)
2A)	Packet arriving at router contains an Application Layer data (including header), of size 950 bytes. The router A has to forward this packet on a link with MTU (maximum transmission unit) is 200 bytes. Router B which is connected to Router A and receiver has to forward packets with MTU of 150 bytes. Write the number of fragments that the IP datagram will be divided into for transmission is and the fragmentation fields in IP header for all the packets.	(5)
2B)	A host with IP address 120.224.10.20 and physical address B2:34:55:10:22:30 has to send a packet to another host B with a IP address 120.224.20.30 and physical address A4:6E:F4:59:80:85. The two hosts are on the same Ethernet network. Show the ARP request and reply packets encapsulated in Ethernet frames (hexadecimal representation).	(3)
2C)	Consider a host A generates a packet and transmits it through the internet to host B at 4:30 PM. The host B receives the packet at 4:40 PM and replies to the host A at 4:45 PM. The host A receives the reply packet from host B at 4:50 PM. Calculate the round-trip time during the communication between host A and host B.	(2)
3A)	Consider the network shown in the Fig. 3a distance vector routing is used to build the routing tables for each node of the network. Show initial and final tables for all nodes.	(5)



3B)	The following is a dump of a UDP header in hexadecimal format (3) CB84000D001C001C
	i. What is the source port number?
	ii. What is the destination port number?
	in. What is the length of the data?
	v. Is the packet directed from a client to a server or vice versa? vi What is the client process?
3C)	Mention the various flag bits used for connection establishment phase of TCP with its state diagram. (2)
4A)	How TCP delivers entire stream of data in order, without error and without any part lost or duplicated? Demonstrate with suitable scenarios. (5)
4B)	What is the significance of sending acknowledgement with receiving windows size rwnd=0. How it is (3) handled at the sender.
4C)	Daytime Server, using port number 13 is in LISTEN state, receives a request from client TCP with (2) the TCP header dump CB8400A100002329 Identify the response of server. Depict it using the time line diagram.
5A)	A resolver sends a query message to a local server to find the IP address for the host (5) "abcd.efgh.org.". Generate the query and response messages. What is the flag value for this message and how it is interpreted?
5B)	Using Basic Encoding Rules, show how the following record is encoded in SNMP. (3) INTEGER OCTET STRING Counter
	3456 "MONITOR" 2313
5C)	A DHCP packet is encapsulated in a UDP packet, which is encapsulated in an IP packet, which is encapsulated in an Ethernet frame. Find the efficiency of a DHCP packet when no option is used. The efficiency in this case is measured in the number of bytes in the DHCP packet to the total number of bytes transmitted at the data link layer.

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