

Q.P. Code: 20940**(Time: 2½ Hours)****[Total Marks: 75]**

- N. B.:
- (1) **All** questions are **compulsory**.
 - (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 - (3) Answers to the **same question** must be **written together**.
 - (4) Numbers to the **right** indicate **marks**.
 - (5) Draw **neat labelled diagrams** wherever **necessary**.
 - (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:**15**

- a. State and explain various types of networks. What are the different ways to access the Internet?
- b. What is Internet standard? Explain the maturity levels of RFC.
- c. Protocol layering can be found in many aspects of our lives such as air travelling. Imagine you make a round-trip to spend some time on vacation at a resort. You need to go through some processes at your city airport before flying. You also need to go through some processes when you arrive at the resort airport. Show the protocol layering for the round trip using some layers such as baggage checking/claiming, boarding/unboarding, takeoff/landing.
- d. Discuss the different quality of service characteristics for overall network performance.
- e. What are the different modes in which the transmission of binary data can be accomplished? Explain each mode.
- f. Draw the constellation diagram for the following cases. Find the peak amplitude value for each case and define the type of modulation (ASK, FSK, PSK, or QAM). The numbers in parentheses define the values of I and Q respectively.
 - i. Two points at (2, 0) and (3, 0)
 - ii. Two points at (3, 0) and (-3, 0)
 - iii. Four points at (2, 2), (-2, 2), (-2, -2), and (2, -2)
 - iv. Two points at (0, 2) and (0, -2)

2. Attempt any three of the following:**15**

- a. List the different error correcting codes. Explain any two in detail with examples.
- b. What are the functions of data link layer? What is the relationship between packets and frames? Explain the different methods of framing.
- c. We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 2 bits from each digital source, but one extra bit is added to each frame for synchronization. Answer the following questions:
 - i. What is the size of an output frame in bits?
 - ii. What is the output frame rate?
 - iii. What is the duration of an output frame?
 - iv. What is the output data rate?
 - v. What is the efficiency of the system (ratio of useful bits to the total bits)?
- d. What are the different types of transmission media? Explain each type.
- e. What is virtual circuit network? What are its characteristics?
- f. Explain the three phases of communication in a circuit switched network.

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3. Attempt any three of the following:**15**

- What is HDLC? What are the different types of frames in HDLC? Explain the different fields in HDLC frames.
- Explain the transition phases of point-to-point protocol.
- Discuss the addressing mechanisms of IEEE 802.11 project.
- Explain the architecture of Bluetooth.
- Explain the spanning tree algorithm.
- What is Virtual LAN? How are stations grouped into different VLANs? Explain.

4. Attempt any three of the following:**15**

- Explain the two ways of forwarding of IP packets.
- What is dynamic host configuration protocol? Explain the DHCP message format.
- Assume the shortest path in a graph from node A to node H is $A \rightarrow B \rightarrow H$. Also assume that the shortest path from node H to node N is $H \rightarrow G \rightarrow N$. What is the shortest path from node A to node N?
 - Explain why a router using link-state routing needs to receive the whole LSDB before creating and using its forwarding table. In other words, why can't the router create its forwarding table with a partially received LSDB?
 - Is the path-vector routing algorithm closer to the distance-vector routing algorithm or to the link-state routing algorithm? Explain.
- What is routing information protocol? Explain the RIP algorithm.
- Draw and explain the IPv6 header format.
- What are the different transition strategies from IPv4 to IPv6? Explain.

5. Attempt any three of the following:**15**

- With the help of a diagram, explain the Go-Back-N protocol.
- Explain the persistent and non-persistent connection.
- Explain the architecture of electronic mail.
- What is DNS? How is name-address resolution done?
- What is secure shell? Explain the components of secure shell.
- In a network with fixed value for $m > 1$, we can either use the Go-Back-N or the Selective-Repeat protocol. Describe the advantage and the disadvantage of using each. What other network criteria should be considered to select either of these protocols?