

(Time: 2½ hours)

Total Marks: 75

- N. B.: (1) **All** questions are **compulsory**.
 (2) Makes **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 labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

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- Explain the types of transmission modes for data flow.
- Discuss the advantages and disadvantages of different network topologies.
- What is Shannon capacity of noisy channel?
The signal-to-noise ratio is given as 36dB and the channel bandwidth is 2 MHz. Calculate theoretical channel capacity.
- What are the different types of transmission impairments?
- Distinguish between data rate and signal rate.
A signal is carrying data in which one data element is encoded as one signal element ($r=1$). If the bit rate is 100kbps, what is the average value of the baud rate if c is between 0 and 1?
- Define constellation diagram. Explain its role in analog transmission.

2. Attempt any three of the following:

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- Describe the goals of multiplexing. Which are the 3 multiplexing techniques?
- Define FHSS (Frequency Hopping Spread Spectrum). Explain how it achieves bandwidth sharing.
- Discuss the advantages and disadvantages of optical fiber.
- Explain the two technologies of circuit switching.
- List and explain the services provided by data link layer.
- How does a single-bit error differ from a burst error?

3. Attempt any three of the following:

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- Compare and contrast flow control and error control.
- Explain the working of stop-and-wait protocol.
- Discuss the concept of pure ALOHA.
- Write note on TDMA (Time Division Multiple Access).
- Discuss *any five* characteristics of standard Ethernet.
- Write short note on routers.

4. Attempt any three of the following:

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- List and explain the services provided by network Layer.
- Write short note on NAT (Network Address Resolution)

[TURN OVER]

- c. What is fragmentation? Discuss the three fields in an IP datagram related to fragmentation.
- d. How to overcome instability in distance vector routing algorithm.
- e. Discuss different timers in RIP (Routing Information Protocol).
- f. Differentiate between IPv4 and IPv6.

5. Attempt any three of the following:

- a. Explain the concept CSMA/CA.
- b. Explain the services provided by User Datagram Protocol (UDP).
- c. Discuss the three-way handshaking in TCP (Transmission Control Protocol) for connection establishment.
- d. Explain the process of transferring a mail.
- e. Explain the architecture of World Wide Web (WWW).
- f. Briefly explain the different timers in TCP (Transmission Control Protocol).

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