

22322

24225

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Solve any FIVE :

5 × 2 = 10

- (a) List key elements of protocol.
- (b) List the types of unguided media. (any two)
- (c) Define Multiplexing.
- (d) List any two standard organizations.
- (e) Define data encapsulation.
- (f) State the need for modulation in data communication. (any two)
- (g) List any two features of NFC.

2. Solve any THREE :

3 × 4 = 12

- (a) Describe the characteristics of data communication system. (any four)
- (b) Explain satellite communication with suitable block diagram.



- (c) Explain the construction of shielded & un-shielded twisted pair cables with neat diagrams.
- (d) Describe the process of Fixed size framing.

3. Solve any THREE :**3 × 4 = 12**

- (a) Differentiate between analog & digital signals on the following basis :
 - (i) Nature of signal
 - (ii) Range
 - (iii) Noise level
 - (iv) Reliability
- (b) Describe the construction of the fiber optics cable with a neat sketch.
- (c) Explain the principle of frequency spread spectrum system.
- (d) A bit stream 10111001 is transmitted using the standard CRC method. The generator polynomial is $x^4 + x + 1$. Write the actual bit string transmitted.

4. Solve any THREE :**3 × 4 = 12**

- (a) Compare synchronous TDM and statistical TDM based on :
 - (i) Channel utilization
 - (ii) Channel capacity
 - (iii) Error control
 - (iv) Transmission delay
- (b) Draw a neat diagram of virtual circuit switching and explain.
- (c) Find the LRC for the sending data blocks 11100111 11011101 00111001 10101001 and determine the data that is transmitted.
- (d) Explain stop and wait protocol with a neat sketch for flow and error control.
- (e) Compare DSSS and FHSS techniques of spreading spectrum. (any 4 points)

5. Solve any TWO :**2 × 6 = 12**

- (a) Draw and explain Phase Shift Modulation (PSK) system with its applications, advantages & disadvantages.
- (b) Compare radiowave, microwave and infrared waves based on :
 - (i) Frequency band
 - (ii) Wavelength
 - (iii) Applications
- (c) Explain bluetooth layered architecture with suitable diagram. List applications, advantages & disadvantages of bluetooth.

6. Solve any TWO :**2 × 6 = 12**

- (a) Describe circuit-switched communication network with neat sketch based on following phase mechanism :
 - (i) Setup phase
 - (ii) Data-transfer phase
 - (iii) Tear down phase
 - (b) Draw the OSI model layered architecture and state the function of each layer.
 - (c) Compare 3G & 4G systems with the following points :
 - (i) Standards
 - (ii) Data
 - (iii) Spectrum
 - (iv) Switching method
 - (v) Services
 - (vi) Multiple access techniques
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