

22322

22232

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.

Marks

1. **Attempt any FIVE of the following :** **10**
 - (a) Define protocol and list different elements of protocol.
 - (b) Define Error. Enlist different types of errors.
 - (c) State any two applications of FDM.
 - (d) Define Multiplexing.
 - (e) State the principle of bit stuffing.
 - (f) Define the term bandwidth with an example.
 - (g) List different types of satellites.

2. **Attempt any THREE of the following :** **12**
 - (a) With neat sketch describe the components of data communication.
 - (b) Compare unshielded twisted pair cable and shielded twisted pair cable. (4 points)
 - (c) Explain parity check error detection method with suitable examples for odd and even parity.
 - (d) Differentiate Frequency modulation and Amplitude modulation (4 points).



- 3. Attempt any THREE of the following : 12**
- (a) Explain radio wave transmission systems.
 - (b) If a periodic signal is decomposed into five sine waves with frequency of 100, 300, 500, 700 and 900 Hz, what is the bandwidth ? Draw the spectrum, assuming all components have a maximum amplitude of 10 V.
 - (c) Describe the construction of Co-axial cable with diagram.
 - (d) Explain IEEE802.11 wireless LAN architecture with suitable diagram.
- 4. Attempt any THREE of the following : 12**
- (a) Draw the BFSK waveform to represent the following bit stream 00101110.
 - (b) Explain synchronous TDM with suitable diagram.
 - (c) Explain the term VOLTE. State two features of VOLTE.
 - (d) Explain one bit sliding window protocol.
 - (e) What is the minimum number of bits in a PN sequence if we use FHSS with a channel bandwidth of $B = 4$ kHz and $B_{SS} = 100$ kHz ?
- 5. Attempt any TWO of the following : 12**
- (a) State advantages, disadvantages and applications of fibre optic cable.
 - (b) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Shows the actual bit string transmitted. Suppose the third bit from left is inverted during transmission. Show that this error is detected at the receiver's end.
 - (c) Draw and explain bluetooth architecture. State the advantages and disadvantages of bluetooth.
- 6. Attempt any TWO of the following : 12**
- (a) Describe datagram approach of packet switching with suitable diagram. Compare datagram approach and virtual circuit approach. (4 points)
 - (b) Draw OSI reference model. Explain functions of any four layers.
 - (c) Four channels are multiplexed using TDM. If each channel sends 100 bytes/s and we multiplex 1 byte per channel.
Answer the following questions :
 - (i) What is the size of the frame ?
 - (ii) What is the frame rate ?
 - (iii) What is the duration of frame ?
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