# 22481

# 12425 03 Hours / 70 Marks Seat No. Instructions - (1) All Questions are Compulsory.

- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary.
- (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

# Marks

10

# 1. Attempt any FIVE of the following :

- a) Define :
  - i) Bit Rate
  - ii) Band Rate
- b) Specify the Bandwidth requirement for BPSK and QPSK.
- c) List the applications of SS.
- d) List the four characteristics of Data Communication.
- e) Define :
  - i) Single Bit error
  - ii) Burst error
- f) Define PN sequence. Comment on maximum length sequence.
- g) Interpret the length of burst errors if transmitted data is 00110011 and received data is 01011001.

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a)

c)

e)

i)

ii)

i)

ii)

iii)

2.

#### 3. Attempt any FOUR of the following :

Identify applications that uses ASK, FSK or PSK modulation a) techniques -

- i) Analog Voice Band Telephone lines
- ii) Low speed telemetry circuits.
- iii) Modems operating at high speeds.
- Compare circuit switching and packet switching w.r.t. following b) points.
  - i) Information Type
  - ii) Routing scheme
  - iii) Bandwidth available
- Explain the process of checksum with example. c)

12

12

- Encode binary sequence 10110101 using. d)
  - Unipolar RZ i)
  - ii) Polar – NRZ
  - AMI line coding techniques. iii)
- Five channels each with 300 KHz bandwidth are multiplexed using e) FDM. Find the minimum bandwidth of the link if guard band of 20 KHz is used.

#### 4. Attempt any THREE of the following :

12

- a) Define the following terms :
  - i) Entropy
  - ii) Information Rate
  - iii) Channel capacity
  - Repeater Distance iv)
- b) Draw waveforms for binary data 10101101 in ASK, FSK, PSK and QPSK modulation.
- c) Explain the working of FDMA. Give its two advantages.
- Identify which of the following given applications uses circuit d) switching and packet switching :
  - i) Data Centre Networks.
  - Local Area Networks. ii)
  - iii) Ethernet
  - Dial up network connections. iv)
- Generate CRC code for data 100100 and divisor is 1101. e)

## 5.

# Attempt any THREE of the following :

- 12
- a) Draw and explain the block diagram of Digital communication system.
- Calculate minimum no. of bits in PN sequence if FHSS is b) used with a channel bandwidth of 5 KHz and spread spectrum bandwidth of 120 kHz.

- c) Explain Go Back N ARQ flow and error control techniques.
- d) The following bit stream is encoded using VRC, LRC and even parity. Locate and correct the error if present. The bit stream is : 11000011, 11110011, 10110010, 00001010, 00100110, 00100111, 10100011.
- e) Fig. No. 1 shows a switch in a virtual circuit n/w. Find the output port and the output VCI for packet with the following i/p port and i/p VCI addresses : packet 1:3, 78, packet 2:2, 92, packet 3:4, 56, packet 4:2, 71.

Incoming		Out going	
Port	NCI	Port	VCJ
1	19	3	22
2	71	4	41
2	92	. 1	45
3	58	2	43
3	78	2	70
4	56	3	11





# 6. Attempt any <u>TWO</u> of the following :

- 12
- a) The probabilities of 5 source messages are  $m_1 = 0.2$ ,  $m_2 = 0.3$ ,  $m_3 = 0.2$ ,  $m_4 = 0.15$  and  $m_5 = 0.15$ 
  - i) Generate Huffman codes for the given data.
  - ii) Find the coding efficiency for Huffman coding.
- b) Construct the constellation diagram and phasor diagram of 4QAM and 8QAM.
- c) Draw and explain block diagram of TDM. State its advantages.