22428

11920

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following : **5 × 2 = 10**

(a) Define (i) Bit rate (ii) Baud rate

(b) State the Hartley's law with mathematical expression.

(c) State sampling theorem. Define Nyquist rate.

(d) Classify the modulation techniques.

(e) State two advantages of WDM technique.

(f) List the various multiple access techniques.

(g) Define the concept of spread spectrum.

2. Attempt any THREE of the following : **3 × 4 = 12**

(a) State the advantages and disadvantages of digital communication system.

(b) Draw the block diagram of DM transmitter. Explain each block in detail.

(c) Explain flat top sampling with circuit diagram. Draw flat top sampled signal.

(d) Describe amplitude shift keying (ASK) modulation with suitable circuit diagram.

3. Attempt any THREE of the following : **3 × 4 = 12**

(a) Draw the block diagram of digital communication system. Explain the function of source encoder and channel encoder.

(b) Explain DPCM with block diagram.

(c) Distinguish between TDMA and CDMA (any four points).

(d) Compare FDM & TDM systems (any four points).

4. Attempt any THREE of the following : 3 × 4 = 12

(a) State the Shannon Hartley's theorem for channel capacity. Explain the effect of S/N ratio and bandwidth on channel capacity.

(b) Describe PCM transmitter with block diagram.

(c) Describe North American (T-carrier) digital multiplexing hierarchy with neat diagram.

(d) Explain direct sequence spread spectrum (DSSS) transmitter with block diagram.

(e) Construct the Hamming code for the data 1010 with odd parity.

5. Attempt any TWO of the following : 2 × 6 = 12

(a) A discrete memoryless source has an alphabet of seven symbols with probabilities for its output given in the following table :

Symbol	S_0	S_1	S_2	S_3	S_4	S_5	S_6
Probability	0.25	0.25	0.125	0.125	0.125	0.0625	0.0625

Compute :

(i) Huffman code for the above source.

(ii) The coding efficiency of the designed Huffman code.

(b) Compare binary ASK, FSK & PSK modulation techniques (any six points).

(c) "Adaptive Delta modulation reduces slope overload distortion and granular noise present in Delta modulation". Justify the above statement regarding ADM.

6. Attempt any TWO of the following : 2 × 6 = 12

(a) Explain QPSK transmitter with block diagram its constellation diagram.

(b) Distinguish between m-ary PSK & m-ary FSK techniques. (Any six points)

(c) Explain fast frequency hopping technique with suitable waveforms. State its advantages and disadvantages.

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