

Digital Data Communications

Con. 4935-06.

YM-5857

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any four questions from the remaining six questions.
 (3) Figures to the right indicate full marks.
 (4) Make suitable assumptions wherever necessary.
1. (a) Draw the block diagram of OPQSK transmitter and receiver and explain the functioning. Also draw the signal space representation. 10
 (b) Draw the block diagrams of BPSK and DPSK and compare both. 10
 2. (a) Derive an expression from the probability of error of an integrate and dump receiver. 10
 (b) Explain M. ary Fsk with the help of a neat block diagram of transmitter and receiver. Also draw the PSD. 10
 3. (a) State and prove Sampling Theorem. 10
 (b) Explain slow frequency hopping and fast frequency hopping with the help of waveforms. Compare their merits and demerits. 10
 4. (a) Define the following : 10
 (i) Hamming distance
 (ii) Hamming bound
 (iii) Code rate
 (iv) Code efficiency
 (v) Systematic and non-systematic codes.
 (b) An error control code has the following parity check matrix— 10

$$H = \begin{bmatrix} 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$
 - (i) Determine the generator matrix G.
 - (ii) Find the code word that begins with 101 ...
 - (iii) Decode the received code word 110110. Comment on error detection and correction capability of this code.
 5. (a) Explain coder and decoder for cyclic codes. Also list the advantages and disadvantages of cyclic codes. 10
 (b) Determine the coded message for the following 8 bit data codes using the following CRC generating polynomial $P(x) = x^4 + x^3 + x^0$ 10
 (i) 11001100 (ii) 01011111.
 6. (a) Draw the block diagram of MSK transmitter. Why MSK is called Shaped QPSK ? 10
 (b) Explain the following in detail with respect to a Convolutional code :— 10
 (i) Code tree
 (ii) Trelli's diagram
 (iii) State diagram
 (iv) Code rate Q constraint length.
 7. Write short notes on any three :— 20
 (a) ISI and ICI
 (b) Tamed FM
 (c) Bit Synchronizer
 (d) Sample and Hold Circuit.