Total No. of Questions : 8]

SEAT No. :

P3672

[Total No. of Pages : 3

[4758]-557

T.E. (Electronics)

DATA COMMUNICATION

(2012 Course) (End - Sem.) (Semester - I)

Time : 3 Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) List the factors to be considered for selection of transmission media. What are the major advantages of STP over UTP? **[7]**

b) Explain with suitable block diagram and waveforms, working principle of DPCM. **[7]**

c) Compare ARQ and FEC methods of error control. **[6]**

OR

Q2) a) A binary LBC has a generator matrix **[7]**

$$G = \begin{bmatrix} 1 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

Determine all its code words.

b) Describe constructional details of co-axial cable. Compare its characteristics with twisted pair cable. **[7]**

c) The fixed step delta modulator (DM) of 0.4V size is provided with input sinusoide message of 1KHz. If sampling frequency is four times the Nyquist rate, determine the maximum permissible amplitude of the message signal, if slope overload is to avoided. **[6]**

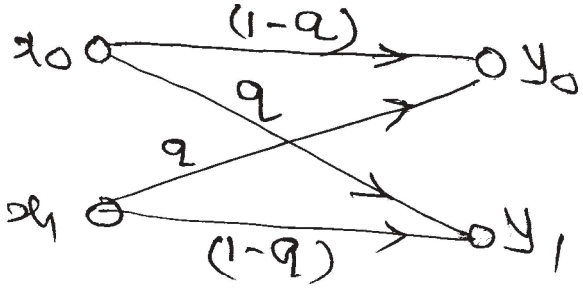
P.T.O.

Q3) a) An information source is producing sequence of independent symbols X_1, X_2, X_3 and X_4 with probabilities $P(X_1) = 0.5$, $P(X_2) = 0.25$, $P(X_3) = P(X_4) = 0.125$. **[8]**

i) Obtain an unambiguous binary code for the output of this source using Shannan-Fano scheme.

ii) Compute its coding efficiency.

b) Determine I(X; Y) the mutual information of a binary symmetric channel with $p(x_0) = p(x_1) = 0.5$, $q = 0.5$. **[8]**



OR

Q4) a) Find the channel capacity of a BSC. Sketch channel Vs transitional probability curve. **[8]**

b) Explain cyclic code with its properties. Why cyclic codes are well suited for error detection? **[8]**

Q5) a) Describe in detail QPSK signalling scheme. Show how is it a BW efficient scheme. **[8]**

b) Draw the block diagram of QAM transmitter and explain its operation. **[6]**

c) Compare the noise performance of KSK and PSK for fixed average transmitted power with same noise component. **[4]**

OR

Q6) a) Derive expression for probability of error for QPSK. **[8]**

b) Explain any method of carrier recovery for a coherent bandpass signalling system. **[6]**

c) What are the advantages and disadvantages of M- ary scheme. **[4]**

Q7) a) With suitable block diagram, explain working of BPSK/DS spread spectrum receiver. **[8]**

b) What are the properties of orthogonal codes. **[4]**

c) Compare throughputs of pure ALOHA and slotted ALOHA. **[4]**

OR

Q8) a) Explain CSMA /CD protocol and its efficiency considering typical local area network. **[8]**

b) Compare DS-SS and FH-SS. **[4]**

c) Assume a CSMA/CD system in which the transmission rate on the bus is 1mbps. The bus is 1km long and the propagation delay is 2 μsec/km .. packets are 1000 bits long. Obtain **[4]**

i) A end - to -end delay e_d.

ii) The packet duration Tp.

EEE