

Total No. of Questions : 6]

SEAT No. :

P532

[Total No. of Pages : 2

TE/Insem/APR-120

T.E. (E & TC)

Information Theory, Coding and Communication Networks
(2015 Pattern)

Time :1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

- Q1) a) A zero memory source emits seven symbols with probabilities (0.2, 0.15, 0.02, 0.1, 0.4, 0.08, 0.05). Compute coding efficiency, when above symbols are encoded by shanon fano source coding technique. [6]
- b) List properties of mutual information. [4]

OR

- Q2) a) Encode following symbols using Huffman source coding technique and calculate coding efficiency. [8]
- $$\left[\frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}, \frac{1}{4}, \frac{1}{16}, \frac{1}{8} \right]$$
- b) State objectives of source coding. [2]

- Q3) a) Parity matrix of (7,4) LBC is as follows : [6]

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

Find the code word for the message

- i) 0 1 0 1
 - ii) 1 0 1 0
- b) Explain following terms with reference to Linear Block Code. [4]
- i) Hamming Weight
 - ii) Hamming Distance

OR

P.T.O.

- Q4) a)** Ideal communication system has SNR of 10 and Band width of 1 MHz. [6]
Find channel capacity.
If SNR drops to 5, what will be new B.W. required for same capacity?
If B.W. drops to half, what will be new SNR for same capacity?
- b) Explain the syndrome decoding operation for (n,k) block code with the help of diagram. [4]

- Q5) a)** Find all elements of GF(8) with primitive polynomial x^3+x+1 and hence compute minimal polynomial for $\alpha^2+\alpha+1$. [6]
- b) Draw hardware arrangement for (7,4) cyclic encoder using $g(x) = 1+x^2+x^3$. [4]

OR

- Q6) a)** By using polynomial division method, obtain code vectors for $d = [10 10]$. Assume generating polynomial $g(x) = 1+x^2+x^3$. [6]
- b) Explain Following terms : [4]
- Galois Field
 - Primitive Element

