Roll No. .....

22144

M. E. 1st Semester
Electronics & Communication Engg. Examination–
December, 2016

INFORMATION & COMMUNICATION THEORY

Paper : MEEC-505

Time : 3 hours ***Max. Marks : 100***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

Note: Attempt any **five** questions in total. All question carry equal marks.

1. (a) What is entropy ? Explain various properties of entropy. (10)

(b) A channel is described by the following channel matrix : (10)

6. (a) Explain Burst erro rrecting block codes with suitable d m. (10)

(b) For the (6, 3) block with generator matrix : (10)

$$G = \begin{matrix} 1\,0\,1\,1\,0\,0 \\ 0\,1\,1\,0\,1\,0 \\ 1\,1\,1\,0\,0\,1 \end{matrix}$$

Find the corresponding words for all possible data words.

7. Explain encoding and d ıg procedure of BCH codes. How can sy ıe computation be utilised for BCH co Explain with suitable example. (20)

8. Write short notes on :

(a) Performance of Turb s. (10)

(b) Error probability r and lower bounds. (10)

$$[P(Y/X-)] = \begin{matrix} 0.: & 0 \\ 0 & 1 \end{matrix}$$

(i) Draw the cha liagram.

(ii) Find the chan apacity

2. (a) Explain the mc ement of mutual information and c the expression for channel capacity. (10)

(b) A discrete source s one of the eight symbols once e millisecond with probabilities 1/8 , 3/8, 3/8, 4/8, 5/8, 7/8 and 7/8 ctively. Determine the source entrop information rate. (10)

3. (a) Examine source e ıg in details along with the basic pro s of codes. (10)

(b) Apply the Sh -Fano encoding procedure to the f ıg DMS X : (10)

$[X] = [x_1, x_2, x_3, x_4, x_5, x_6, x_7]$

$[P] = [1/3, 1/6, 1/5, 1/12, 1/12, 1/10, 1/12]$

4. (a) What is the purpose of the Hamming code ? How can we use the Hamming code to correct a burst error ? (10)

(b) Find the checksum for the following bit sequence. Assume a 16 fit sequence size. (10)

(i) 1001001110010011

(ii) 1001100001001101

5. (a) Draw the encoder circuit for an (n, k) linear systematic block code. (10)

(b) For the (7, 4) linear block code, consider r = 1011010 be the received vector at the receiver. Calculate the syndrome and then determine the error vector r. (10)

6. (a) Explain Burst erro recting block codes with suitable di ı. (10)

(b) For the (6, 3) block with generator matrix : (10)

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