Code: EC7T5C

IV B.Tech - I Semester – Regular / Supplementary Examinations
November 2016

ADVANCED CODING THEORY TECHNIQUES
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

Answer any FIVE questions.   All questions carry equal marks

1. a) Consider a sequence of letters of the English alphabet with their probability of occurrence as given here.   8 M

Letter	a	i	l	m	n	o	p	y
Probability	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1

Compute Huffman coding.

   b) Show that the channel capacity of a binary symmetric channel is C=1-H(p).   6 M

2.   Consider a (7, 4) code whose generator matrix is   14 M

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

   a) Compute all code words of code

   b) Develop parity matrix check matrix of the code

   c) Compute the syndrome for the received vector 1101101.

3. A rate 2/3 convolution code is described by g1=[1011], g2=[1101], g3=[1010]. Construct the encoder, code tree, code trellis and state diagram corresponding to this code.

14 M

4. a) Write about extended Golay codes.   6 M

   b) How Reed-Solomon code will be encoded and decoded?

8 M

5. a) Explain TCM Encoding and TCM decoding.   10 M

   b) Discuss the coding gain for 8-PSK with a 4-state Trellis.

4 M

6. Draw the block diagram of convolutional Interleaver and explain with suitable example. Also discuss types of convolutional Interleavers and delays of convolutional Interleavers.   14 M

7. a) Draw the block diagram of turbo decoder and extrinsic form of turbo decoder and explain.   10 M

   b) Discuss the performance of Turbo codes.   4 M

8. a) Explain the construction of Low Density Parity check Codes. 9 M

   b) Explain the minimum distance of LPDC codes. 5 M