

Code: ECMC1T6B

I M.Tech-I Semester-Regular Examinations-April 2013

CODING THEORY & PRACTICE
(MICROWAVE & COMMUNICATION ENGINEERING)

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. (a) Define discrete entropy of a random variable X and find the entropy of a discrete memoryless source with probabilities
 $\{0.3, 0.25, 0.2, 0.15, 0.1\}$. 6 M
- (b) Using Huffman coding procedure construct binary optimal code for the following probabilities and find the coding efficiency.
 $\{0.2, 0.2, 0.15, 0.15, 0.1, 0.1, 0.05, 0.05\}$. 8 M
- 2.(a) What are all the message vectors can be extracted from the code vector that was Generated by $1+X+X^3$. 8 M
- (b) Compare coded and uncoded systems? 6 M
- 3.(a) Explain in detail about Trellis code diagram with numerical example? 8 M

- (b) Explain about structural properties and performance of convolution codes? 6 M
4. (a) What are linear block codes ? Define code rate. How does redundancy in code affect the efficiency and error ? 8 M
- (b) Write about Modified Linear Block codes? 6 M
5. (a) Explain about the properties of Extension fields and Rings ? 7 M
- (b) Explain about the minimal polynomials and conjugates? 7 M
6. (a) Write about decoding algorithms for BCH and RS codes ? 8 M
- (b) Discuss about cyclic redundancy check for error detection? 6 M
7. (a) Construct a systematic (7, 4) cyclic code using the generator polynomial

$$g(x) = x^3 + x + 1$$
 i) What are the error correcting capabilities of this code?
 ii) Construct the decoding table.
 iii) If the received word is 1101100, determine the transmitted data word. 9 M
- (b) Write about concatenated code. 5 M

8. (a) Write in detail about the codes for magnetic recording along with a neat diagram? 7 M

(b) Write in detail about the compact disc along with a neat diagram? 7 M