PVP 12

Code: **ECMC1T6B**

**I M.Tech - I Semester - Regular Examinations – April 2015**

# CODING THEORY & PRACTICE

## (MICROWAVE & COMMUNICATION ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) A voice- grade channel of the telephone network has a bandwidth of 3.4 kHz. 7 M
   i) Calculate the information capacity of telephone channel for a signal to noise ratio of 30dB.
   ii) Calculate the minimum signal to noise ratio required to support information transmission through the telephone channel at the rate of 9600 b/s.

   b) Explain about mutual information. Explain its properties 7 M

2. a) Explain how error control codes improve the performance of communication systems. 7 M

   b) Explain hamming and error control coding with examples 7 M

3. a) Explain linear convolutional encoders with example. 7 M

b) Discuss the structural properties of convolutional codes. 7 M

4. a) Construct parity check and generator matrices for a (7,4) hamming code. 7 M

b) Explain the properties of linear block codes. 7 M

5. a) Explain the elementary properties finite fields. 7 M

b) Discuss the properties of minimal polynomials and conjugate elements. 7 M

6. a) Let $C_1$ be the binary cyclic code of length 15 generated by $g(x)= x^5+x^4+x^2+1$ 7 M

i) Compute the parity check polynomial for $C_1$ and show that g(x) is a valid generator polynomial.

ii) Determine the dimension of $C_1$ and compute the number of code words in $C_1$.

b) Explain shift register encoders and decoders for cyclic codes. 7 M

7. a) Explain the design procedure for BCH code. 7 M

b) Explain the basic properties of Reed Solomon codes. 7 M

8. a) Explain various types of interleavers. 7 M

b) With a diagram explain various stages in a CD recording process. 7 M