C 80830 (Pages : 2) Name.....

Reg. No.....



# SIXTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, APRIL 2015

## IT 09 L03—INFORMATION THEORY AND CODING

Time : Three Hours Maximum : 70 Marks

### Part A (Short answer questions) (one/two sentences)

*Answer* **all** *questions.*
*Each question carries* 2 *marks.*

1. What is the relationship between uncertainty and information ?
2. What is the advantage of Adaptive Delta Modulation ?
3. What is the use of linear block code ?
4. What is the basic of Linear Predictive Coding ?
5. State the channel coding theorem for a discrete memory less channel.

(5 × 2 = 10 marks)

### Part B (Analytical/Problem solving questions)

*Answer* **four** *questions.*
*Each question carries* 5 *marks.*

6. A telephone channel has a bandwidth of 4 KHz and signal to noise ratio of 31. What is the capacity of this channel ? Suppose, the channels were to be provided with 64 kbps capacity, what is the required signal to noise ratio ?
7. Explain convolution encoder with an example.
8. Discrete memory less source has an alphabet of five symbols with there are given by,

   [X] = [X1, X2, X3, X4, X5]

   [P] = [0.45, 0.15,0.15,0.10.0.15].

   Compute Entropy and second order Extension for the Symbol. Find the amount of Information gained by observing the source.
9. Discuss how an encoding operation takes place in Lempel-Ziv coding using binary sequence ?
10. Compare and contrast BCH codes and reed Solomon codes.
11. Explain in detail about the transform domain representation.

(4 × 5 = 20 marks)

## Part C (Descriptive/Analytical/Problem solving questions)

*Answer* **all** *questions.*

12. (A) Sate source coding theorem and channel coding theorem. Discuss in detail about the implications of these two theorems in Information theory.

*Or*

(B) Define a discrete memory less channel. Discuss in detail about its attributes.

13. (A) With relevant block diagram and expressions, discuss in detail about a Delta Modulation Scheme.

*Or*

(B) Why do we require compression techniques in information coding ? Discuss in detail about static Huffman Coding and Dynamic Huffman Coding, clearly bringing out their similarities and differences.

14. (A) Discuss in detail the adaptive subband coding and justify its importance and relevance.

*Or*

(B) Discuss in detail about linear block codes and relation between message block, codeword block and parity bit block.

15. (A) Explain in detail about the following :—

(i) Maximum likelihood decoding.

(ii) Viterbi decoding.

(iii) Sequential decoding.

*Or*

(B) Discuss about the interleaved convolutional codes.

(4 × 10 = 40 marks)