

G 1051

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Electronics and Communication Engineering

EC 010 702—INFORMATION THEORY AND CODING (EC)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Define the terms : Amount of information, Entropy.
2. What do you mean by Optimal Codes ?
3. Write a note on Binary Symmetric Channel.
4. What is Group ? What are the conditions to be satisfied ?
5. Draw the diagram of a $\frac{1}{2}$ convolutional encoder with memory order 3, whose impulse responses are given as $g^{(0)} = [1011]$, $g^{(1)} = [1111]$.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain the different types of entropy.
7. What is Data Compression ? Explain its significance.
8. What is channel capacity ? Mention the properties of channel capacity.
9. Explain the construction of Galois field.
10. Briefly explain Hamming Codes.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Explain mutual information. Discuss the relationship between Entropy and Mutual information.

Or

Turn over

12. Explain the following :—

- (a) Relative Entropy.
- (b) Information rate.
- (c) Efficiency of channels.

13. What is “Kraft Inequality” in source coding ? Explain. Prove this inequality.

Or

14. Explain the following :—

- (a) Arithmetic Coding.
- (b) Elias Coding.

(6 + 6 = 12 marks)

15. State Shannon-Hartley theorem. Derive the expression for channel capacity of a Gaussian channel.

Or

16. (a) Write a note on Gaussian channel.
(b) What do you mean by symmetric channel ?
(c) Explain zero error code.

(4 + 4 + 4 = 12 marks)

17. (a) What is Linear Block Codes ? Discuss the capabilities of a linear block code.
(b) Write a note on Vector spaces.

(9 + 3 = 12 marks)

Or

18. (a) Discuss the encoding of an (n, k) block code, showing all the relevant matrices and their properties.
(b) What is minimum distance of a block code ? Give its significance.

19. Explain the following :—

- (a) Turbo codes.
- (b) Cyclic code.
- (c) BCH code.

(4 + 4 + 4 = 12 marks)

Or

20. Explain the Viterbi algorithm for decoding of convolutional codes.

[5 × 12 = 60 marks]