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Question Paper Code : 71761

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Fifth Semester

Information Technology

IT 2302/IT 52 — INFORMATION THEORY AND CODING

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Calculate the amount of information if probability of occurrence = $5/8$.
2. List the properties of mutual information.
3. Differentiate LZ coding with LZW coding.
4. State the principles of Psychoacoustic model.
5. What are the special features of MPEG-4 standards?
6. What is meant by motion compensation?
7. Draw the encoder circuit for a (8, 4) linear block code.
8. Write the syndrome properties of linear block code.
9. What is the significance of Turbo coding?
10. What is the difference between block and convolutional codes?

PART B — (5 × 16 = 80 marks)

11. (a) A discrete memory less source has 5 symbols x_1, x_2, x_3, x_4 and x_5 with probabilities $p(x_1)=0.4, p(x_2)=0.19, p(x_3)=0.16, p(x_4)=0.15$ and $p(x_5)=0.1$. Construct a Shannon-FANO code for the source and calculate entropy, efficiency and code variance. (16)

Or

- (b) (i) Explain Channel capacity and derive the channel capacity for binary symmetric channel. (8)
- (ii) Discuss about Mutual information and its properties. (8)
12. (a) Write a detailed note on the following : (16)
- (i) Arithmetic coding
- (ii) LZW algorithm.

Or

- (b) Explain Linear predictive coding in detail. (16)
13. (a) Explain JPEG Image Compression techniques in detail. (16)

Or

- (b) Discuss in detail about Motion Estimation and Motion Compensation technique. (16)
14. (a) Explain the Hamming Codes with example. (16)

Or

- (b) Construct a systematic (7, 4) cyclic code using the generator polynomial $g(x) = x^3 + x + 1$. (16)
- (i) What are the error correcting capabilities of this code?
- (ii) Construct the decoding table.
- (iii) For the received code word 1101100, determine the transmitted data word.

15. (a) With suitable examples and diagrams explain the following in detail : (16)
- (i) Code Tree
 - (ii) Trellis
 - (iii) State Diagram.

Or

- (b) Explain in detail the Viterbi algorithm for decoding of convolutional codes with a suitable example. (16)



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