Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

D 4214

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Fourth Semester

Information Technology

IT 1251 — INFORMATION CODING TECHNIQUES

(Regulation 2004)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State channel capacity theorem.

2. What is transition matrix? Give its significance.

3. What is granular noise?

4. Give the principle behind DPCM.

5. Define syndrome.

6. Give the error correcting capability of a linear block code.

7. Define statistical encoding.

8. What is differential encoding?

9. What is temporal masking?

10. Give the advantages of perceptual coding.

PART B — (5 × 16 = 80 marks)

11. (a) (i) The five symbols of the alphabet of a discrete memoryless source and their probabilities are {s0, s1, s2, s3, s4} and {0.4, 0.2, 0.2, 0.1, 0.1} respectively. Compute the codewords of Huffman Code and Shannon Fano code and compare their efficiencies Also compute the Entropy of the source (12)

    (ii) State and explain Channel coding theorem. (4)

Or

    (b) (i) State and discuss the properties of entropy. (6)

    (ii) Consider a discrete memoryless source with source alphabet {s0, s1, s2} and probabilities {1/4, 1/4, 1/2}. Determine the entropy of the extended source. (6)

    (iii) State and explain source coding theorem. (4)

12. (a) Write notes on :

    (i) Adaptive subband coding. (8)

    (ii) Adaptive delta modulation. (8)

Or

    (b) Write notes on :

    (i) LPC. (8)

    (ii) Adaptive differential pulse code modulation. (8)

13. (a) Consider a convolutional encoder which has two paths numbered 1 and 2. The impulse response of path 1(upper path) is (1,1,1) and the impulse response of path 2 (lower path) is (1,0,1). Draw the block diagram of the encoder Compute the codeword for the message sequence 10011. Also draw the code tree, trellis diagram and state diagram for the encoder. (16)

Or

    (b) (i) Explain cyclic codes with its generator polynomial and parity check polynomial. (8)

    (ii) Consider the (7, 4) Hamming code with P = 1 1 0. Determine the codeword for

        0 1 1

        1 1 1

        1 0 1

    the message 0010. Suppose the codeword 1100010 is received. Determine if the codeword is correct. If it is in error correct the error. (8)

14. (a) Explain dynamic huffman coding. Illustrate it for the message "This is". (16)

Or

(b) Write notes on the following :

(i) GIF. (8)

(ii) Digitized Documents. (8)

15. (a) Explain MPEG audio coders with a neat diagram. (16)

Or

(b) Write notes on the following :

(i) Dolby audio coders. (8)

(ii) Video compression principles. (8)

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