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Question Paper Code: 41456

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fifth Semester

Electronics and Communication Engineering

14UEC506 - INFORMATION THEORY AND CODING

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Huffman coding technique is adopted for constructing the source code with _____ redundancy.

   (a) minimum (b) constant (c) maximum (d) unpredictable

2. In channel coding theorem, channel capacity decides the _____ permissible rate at which error free transmission is possible.

   (a) maximum (b) minimum (c) constant (d) none of these

3. Which among the following compression techniques is/are intended for still images?

   (a) JPEG (b) H.263 (c) MPEG (d) All the above

4. Why is sound masking required?

   (a) to bring the background level up to the optimum
   (b) to synchronise the back ground level
   (c) to stable the background level
   (d) none of the above

5. GIF stands for _____.

(a) Graphics Interchange Format (b) Green Impact Format
(c) Gentle Information Format (d) None of the above

6. How many frames per second are required for animation?

(a) 24 (b) 34 (c) 44 (d) 54

7. The minimum distance of linear block code (d_{min}) is equal to minimum number of rows or columns of H^T, whose _____ is equal to zero vector?

(a) sum (b) difference (c) product (d) divison

8. In a linear code, the minimum Hamming distance between any two code words is _____ minimum weight of any non-zero code word.

(a) equal to (b) greater than (c) less than (d) none of these

9. While representing the convolutional code by (n, k, m), what does 'm' signify or represent in it?

(a) memory order (b) message bits (c) coded bits (d) all the above

10. In Viterbi's algorithm, the selected paths are regarded as

(a) survivors (b) defenders (c) destroyers (d) carriers

PART - B (5 x 2 = 10 Marks)

11. What is meant by discrete memoryless channel?

12. Define on perceptual coding.

13. Draw the block diagram of MPEG DASH standard.

14. Write about cyclic codes for error correction.

15. What is sequential decoding algorithm?

PART - C (5 x 16 = 80 Marks)

16. (a) Generate Shannon-Fano binary, Quaternary codes with probabilities 0.5, 0.25, 0.125, 0.0625, 0.03125, 0.015625, 0.0078125 and 0.0078125. Calculate its efficiency in each case. (16)

Or

(b) Consider a source with source symbol set S = {S1, S2, S3, S4} with probabilities P = {0.2, 0.3, 0.4, 0.1}.Obtain the entropy of the source. Prove that $H(S^2) = 2XH(S)$. (16)

17. (a) Explain with a block diagram model of speech synthesis. (16)

Or

(b) Discuss on linear predictive coding with an example. (16)

18. (a) With neat sketches and necessary mathematical expressions, explain the JPEG encoder. (16)

Or

(b) What is TIFF? Draw and explain the TIFF audio encoder and decoder. (16)

19. (a) The generator matrix for a (6, 3)block code is given below. Find all code vectors of this code.

(i) Find the parity matrix

(ii) Find equation for check bits

(iii) Determine check bits and code vectors for every message vector.

$$G = \begin{pmatrix} 1 & 0 & 0 & : & 0 & 1 & 1 \\ 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 1 & : & 1 & 1 & 0 \end{pmatrix}.$$ (16)

Or

(b) What is minimum distance decoding? Explain in detail. (16)

20. (a) Discuss on convolutional turbo codes. (16)

Or

(b) With an example draw the state diagram of trellis in convolutional code. (16)