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Question Paper Code: 45406

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

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 a discrete memory less channel the output of channel decoder depends on

   (a) Present signal (b) future input signal
   (c) past signal (d) present and past signal

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 these

6. The compression ratio achieved by MPEG-1 standard is

(a) 4000:1 (b) 400:1 (c) 40:1 (d) 4:1

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. If the parity check matrix is H and the error vector is E then syndrome vector S can be calculated by

(a) $S=HE^H$ (b) EH^T (c) $E^T H^T$ (d) $(EH)^T$

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. The method of decoding used in Viterbi decoding is called

(a) Syndrome decoding (b) Least Mean Square decoding
(c) Maximum Likelihood decoding (d) metric diversion

PART - B (5 x 2 = 10 Marks)

11. What is meant by discrete memoryless channel?

12. Define on perceptual coding.

13. State motion compensation.

14. Write about cyclic codes for error correction.

15. What are convolutional codes?

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) Apply Lempel-Ziv algorithm to encode the string 101011011010101011 and obtain the dictionary for the Lempel-Ziv algorithm. (16)

Or

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

18. (a) Discuss in detail about the Image and Video formats. (16)

Or

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

19. (a) The generator polynomial of a (7,4) cyclic code is $G(P) = P^3+P+1$. Find all the code vectors for the code in the systematic and non-systematic form. (16)

Or

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

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

Or

(b) Draw the diagram of the ½ rate convolutional encoder with generator polynomials $g^{(1)}(D) = 1+D$ and $g^{(2)}(D) = 1+D+D^2$. Also compute the encoder output for input sequence 101101. Obtain the code tree, code trellis and state diagram. (16)

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