Register Number: ……..

B.TECH DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Fifth Semester

INFORMATION TECHNOLOGY

ECE272: Information Code Techniques

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. An alphabet set contains 3 letters A, B, C transmitted with probabilities of 1/3, ¼, 1/4. Find entropy.
   a) 1.67 bits/symbol b) 2.56 bits/symbol
   c) 3.12 bits/ symbol d) 1.52832 bits/symbol
2. What is the difference of placing the probability of the new symbol as high as possible and as low as possible in Huffman coding process?
   a) variance of the average code word length c) transmission speed
   c) average code word length d) information generated form code
3. The concepts used in perceptual coding to reduce the amount of information transmitted are _____ and _____
   a) Temporal masking, frequency masking b) Motion estimation, Motion vector
   c) Huffman coding/ run length coding d) threshold of learning , frame size
4. Which coding algorithm is used in GIF & TIFF image format?
   a) modified Huffman coding b) run length encoding
   c) LZW coding algorithm d) Huffman coding
5. After the ear hears a loud sound it takes a further short time before it can hear a quieter sound. This concept is utilized in
   a) Frequency masking b) run length coding
   c) temporal masking d) entropy encoding
6. The frames relate the motion of the objects in preceding as well as succeeding frames is called as
   a) I frame b) B frame
   c) P frame d) S frame

7. Turbo decoding uses _____ algorithm for both stages.
   a) Viterbi algorithm c) Convolutional algorithm
   c) CRC algorithm d) BCJR algorithm
8. Which is true in (n, k) block codes
   a) n- message bits, k-parity bits b) k-parity bits, n-message bits
   c) (n-k)-parity bits, k- message bits d) n-parity bits, (n-k)-parity bits
9. What is the hamming distance between the following two codes. C1= 1001 , C2=1110
   a) 5 b) 2
   c) 3 d) 1
10. Code tree, Trellis, and state diagram are the structural representation of which code.
    a) Cyclic code b) Convolutional code
    c) Hamming code d) Linear block codes

PART – B (10 X 2 = 20)

11. Given Probability of x(n) = { 0.25, 0.20, 0.15, 0.15, 0.10, 0.05}
    For the above given data, Calculate the entropy.
12. Compare Huffman coding and Shannon fano coding.
13. What is the use of quantization table?
14. Differentiate differential encoding and run length coding in JPEG.
15. What is meant by temporal masking?
16. Determine the encoded version of the following difference values which relate to the encoded DC coefficients from consecutive DCT blocks. 12,1,-2,0,-1
17. What is meant by linear code?
18. Draw the syndrome calculator for the (7,4) cyclic code generated by the polynomial $g(X)=1+X+X^3$?
19. What is trellis?
20. What is the function of an interleaver in turbo coding?

PART C (5 x 14 = 70 Marks)

21. a) (i) A discrete memory less source has an alphabet of seven symbols whose probabilities of occurrence are as described below (10)
    Symbol: s0 s1 s2 s3 s4 s5 s6
    Prob : 0.25 0.25 0.0625 0.0625 0.125 0.125 0.125

Compute the Huffman code for this source moving combined symbols as high as possible

(ii) Explain the channel capacity with example of binary symmetric channel. (4)

OR

b) (i) Consider the following binary sequences 111010011000101110100. Use the Lempel – Ziv algorithm to encode this sequence. Assume that the binary symbols 1 and 0 are already in the code book. (10)

(ii) What are the advantages of Lempel – Ziv encoding algorithm over Huffman coding? (4)

22. a) (i) Decode the sequence given the tag value 0.6295 with source symbols A,B,C and D with probabilities of 0.5,0.2,0.2,0.1 respectively. (10)

(ii) What is the motivation of development of Dolby audio coders? Explain its variations also (4)

OR

b) Give detailed explanation of linear predictive coding signal encoder and decoder.

23. a) What is modification done in H.261 Standard to provide the service for video telephony and video conferencing over ISDN? Explain in detail.

OR

b) How an image or picture is encoded using JPEG standard. Explain in detail

24 a) (i) Explain the (n,k) Linear block codes in detail with an example. (10)

(ii) Derive a decoding syndrome table of (7,4) code for all error possible. (4)

OR

b) (i) What is cyclic code? Explain. Find the code word for the message m = 1100 with $g(X)= 1+X+X^3$ in both Polynomial division and also using encoder. (10)

(ii) Assume any error in the above code word and using syndrome calculator correct the error. (4)

25 a) Explain in detail about turbo coding and decoding methods.

OR

b) Describe about the convolutional codes in detail.

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