Reg. No. : | | | | | | | | | | |

Question Paper Code: 55406

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Electronics and Communication Engineering

01UEC506 – INFORMATION THEORY AND CODING

(Regulation 2013)

Duration: 1.15 hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. What is the maximum bit rate for a channel having bandwidth 4100Hz and SNR 10 dB using Shannon's theorem?

   (a) 10000 bits/sec (b) 41000 bits/sec
   (c) 14183.67 bits/sec (d) 1418.367 bits/sec

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. Lempel Ziv algorithm belongs to which type of compression algorithm?

   (a) Arithmetic coding (b) Dictionary based
   (c) static coding (d) Huffman coding

4. The bit allocation information mode that is used by the decoder to dequantize the set of sub band samples in a Dolby AC-1 is known as

   (a) Forward adaptive bit allocation (b) Backward adaptive bit allocation
   (c) hybrid adaptive bit allocation (d) none of the above

5. The compression ratio achieved by JPEG2000 without loss of quality is

   (a) 2000:1 (b) 200:1 (c) 20:1 (d) 2:1

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

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

7. If the degree of the generator polynomial is 3 and the length of the message is 4 then the total number of bits in the cyclic coded sequence is

(a) 4 (b) 3 (c) 7 (d) 11

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

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

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. State and prove Kraft inequality theorem and source coding theorem. (8)

12. Discuss the encoding procedure of LZW compression. Also construct an encoding table for any sentence. (8)

13. With a neat schematic, describe JPEG encoder and decoder. (8)

14. For a (7, 4) code with generator matrix $G = \begin{vmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{vmatrix}$

(i) Find all possible code words. (8)

15. Describe the principle of turbo coding. (8)