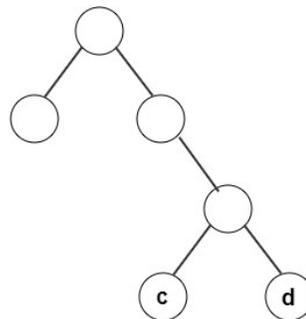


Time: Three hours

Maximum: 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Calculate the entropy of symbol A B C whose probabilities are $1/2, 1/5, 1/3$
 - a. 1.49 bits/symbol
 - b. 1.5 bits/symbol
 - c. 1.35bits/symbol
 - d. 1.68 bits/symbol
2. Audio Compression that is lossy and compares the difference between two samples is
 - a. Linear Predictive Coding (LPC)
 - b. Adaptive Differential Pulse Code Modulation (ADPCM)
 - c. Code Excited Linear Predictor (CELP)
 - d. Silence Compression
3. Compression in Audio can be done for
 - a. Data and Voice
 - b. Picture and Voice
 - c. Video and Voice
 - d. Music or speech
4. Compute the Code for 'd'



- a. 011
 - b. 111
 - c. 101
 - d. 110
5. State the Channel coding theorem for discrete memoryless channel
 6. Point out the slope overload distortion and Granular noise in delta modulation systems.
 7. Distinguish between Hamming Distance and Hamming weight
 8. Formulate the model of LPC.

PART B - (4 X16 = 64 marks)

09. (a) The DMS has given symbols and their probabilities $\{X_1, X_2, X_3, X_4, X_5\}$ and $\{0.2, 0.3, 0.11, 0.16, 0.18, 0.05\}$ respectively. Find the efficiency of the Huffman coding. **(16)**

(OR)

- (b) Analyze the Information rate R of an Analog signal which is band limited to B Hz and sampled at Nyquist rate. The samples are quantized into 4 levels. Each level represents one message for which the probabilities of occurrence of these 4 messages are given as $P_1=P_4=1/8, P_2=P_3=3/8$. **(16)**

10. (a) Formulate the concept of PAM and PCM. **(16)**

(OR)

- (b) A signal having bandwidth of 3kHz is to be encoded using 8 bit PCM and DM system. If 10 cycles of the signal are digitized, state how many bits will be digitized in each case, if sampling frequency is 10 kHz? Also, find bandwidth required in each case **(16)**

11. (a) A convolutional code is described by the following generator sequences, $g(1) = \{1, 0, 1\}$, $g(2) = \{1, 0, 0\}$, $g(3) = \{1, 1, 1\}$. **(16)**

(i) Draw the encoder to this code

(ii) Draw the state diagram

(iii) If the message sequence is 10110, Design the code word

(OR)

- (b) For a systematic linear block code, the three parity check digits P_1, P_2, P_3 are given by **(16)**

$$P_{k,n-k} = \begin{bmatrix} 101 \\ 111 \\ 110 \\ 011 \end{bmatrix}$$

(i) Construct a generated matrix.

(ii) Assess the t code generated by the matrix.

(iii) Determine error-correcting capacity.

(iv) Decode the received words with an example

12. (a) Encode using Arithmetic Coding for the given word "BINARY" and find the code word with Probabilities $B=0.3, I=0.2, N=0.2, A=0.1, R=0.1, Y=0.1$ **(16)**

(OR)

- (b) Perform Adaptive Huffman coding for "aradarvk". **(16)**