Total No. of Questions :8]

SEAT No. :

P2858

[Total No. of Pages :3

[4958] - 1046

T. E. (E & TC)

INFORMATION THEORY & CODING TECHNIQUES

(2012 Pattern) (End - Sem) (Semester - II)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Solve Q1 or 2, Q3 or 4, Q5 or 6, Q7 or 8.***
2) ***Use of calculator is allowed.***
3) ***Assume suitable data if necessary.***

Q1) a) Find entropy to a guassian source X having mean Mx and variance σ_x^2. **[6]**

b) Find capacity of a channel having bandwidth 1MHz and signal to noise ratio of 10dB. **[7]**

c) What are cyclic codes? How are the cyclic codes represented? What is requirement of generator polynomial for cyclic codes? **[7]**

OR

Q2) a) Compare shannon - Fano- and Huffman coding techniques. **[6]**

b) What is standard array decoding? Explain with suitable example. **[7]**

c) For a (5, 1) cyclic code, the generator polynomial used is $g(x) = x^4 + x^3 + x^2 + x + 1$. Draw the encoder & decoder circuit for the cylic code. **[7]**

P.T.O.

Q3) a) Outline the procedure for encoding of RS codes. **[8]**

b) Explain the features of following codes. **[8]**

i) BCH codes

ii) Cyclic hamming codes

iii) CRC Codes

OR

Q4) a) A (7, 4) single error correcting BCH code is generated using generator polynomial $g(x) = x^3 + x + 1$. If received code polynomial is $r(x) = x^6 + x^4$, find the corrected code polynomial. **[8]**

b) What is stop - and - wait ARQ? Explain. **[8]**

Q5) a) "Convolutional coding can be alternative to block coding when block length is large". Justify. **[4]**

b) Draw the state diagram for convolutional encoder whose generators are given as **[8]**

$g_{11} = [1\ 0\ 1]$ $g_{12} = [1\ 1\ 0]$

c) Using polynomial description of convolutional codes, find the codeword generated for input [1 0 1]. Use the encoder given in Q. 5 (b). **[6]**

OR

Q6) a) Draw the steady state trellis for the convolutional encoder whose generators are given as **[6]**

$g_{11} = [1\ 0\ 1]$ $g_{12} = [1\ 1\ 0]$

b) What is sequential decoding of convolutional codes? Explain in brief. What is its disadvantage? **[8]**

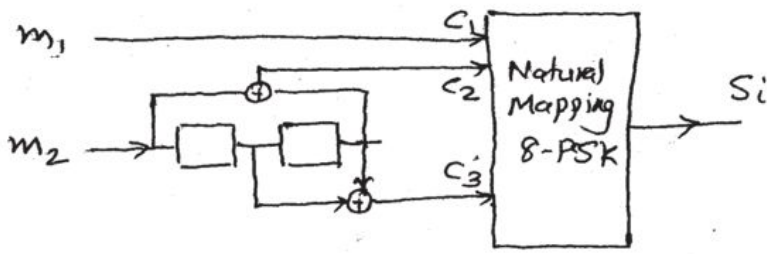
c) Write short note on Turbo cocks. **[4]**

Q7) a) What are the goals & limitation of a communication system designer? Justify with example that some of these goals are conflicting with each other. **[8]**

b) What is mapping by set partitioning in TCM? Explain with suitable example. **[8]**

OR

Q8) a) For the following TCM encoder draw the trellis diagram (Steady state). **[8]**



b) Using error probability curves of MPSK modulation explain the various trade offs between pe, Eb/No and Bandwidth. **[8]**