

B.Tech. SEM -V Info. Tech. 2014 Course (CBCS) : WINTER - 2018
SUBJECT: ELECTIVE – I : INFORMATION THEORY AND CODING

Day: Saturday
Date : 01/12/2018

W-2018-2419

Time : 02.30 PM TO 05.30 PM
Max.Marks: 60

N.B.:

- 1) All the questions are **COMPULSORY**.
 - 2) Figure to the right indicates **FULL** marks.
 - 3) Draw the neat and labeled diagram **WHEREVER** necessary.
 - 4) Assume suitable data, if necessary.
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Q.1 Explain average information content of symbols in long independent sequences. (10)

OR

Consider a discrete memory less source with a source alphabet $A = \{s_0, s_1, s_2\}$ with respective probabilities $p_0=1/4, p_1=1/4, p_2=1/2$. Find the entropy of the source. (10)

Q.2 Explain Shannon's encoding algorithm. (10)

OR

A source emits independent sequences of symbols from a source alphabet containing 5 symbols with probabilities 0.4,0.2,0.2,0.1 and 0.1 (10)

- i) Compute the entropy of the source
- ii) Design a source encoder with a block size of 2
- iii)

Q.3 Explain linear block codes (10)

OR

For a systematic (7,4) linear block code, the parity matrix P is given by (10)

$$P = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

- i) Draw the corresponding encoding circuit
- ii) Draw the syndrome calculation circuit.

Q.4 Explain minimal polynomials of BCH codes (10)

OR

Explain method for generating cyclic code.

Q.5 Explain polynomial description of convolution codes. (10)

OR

Explain matrix description of convolution codes. (10)

Q.6 Explain Ungerboeck's TCM design rules. (10)

OR

Explain performance evaluation for Additive White Gaussian Noise (AWGN) channel. (10)

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