

DEPARTMENT OF INFORMATION TECHNOLOGY

SUBCODE: IT2302

YEAR/SEM:III/V

SUB.NAME: INFORMATION THEORY AND CODING

MARKS:100

PART-A ($10 \times 2=20$)

Answer all the questions

1. Differentiate uncertainty, information and entropy? (Nov/Dec 2010)
2. What is prefix coding? (Apr/May 2011)
3. Define channel capacity theorem (Nov/Dec 2010, Apr/May 2011)
4. Define mutual information. (Nov/Dec 2010)
5. Define efficiency of the source encoder and code variance
6. Define code redundancy
7. Define bandwidth efficiency
8. What is the capacity of the channel having infinite bandwidth
9. Define a discrete memory less channel (May/June 2012)
10. Find entropy of a source emitting symbols x, y, z with probabilities of 1/5, 1/2, 1/3 respectively (Nov/Dec 2011) (May/June 2012)

PART-B ($5 \times 16 =80$)

11. (a) Explain briefly the source coding theorem
(Nov/Dec 2011) (May/June 2012)
(b) Given five symbols s_0, s_1, s_2, s_3 and s_4 with their respective probabilities. 0.4, 0.2, 0.2, 0.1 and 0.1. Use Huffman's encoding for symbols and find the average codeword length. Also prove that it satisfies source coding theorem
Nov/Dec 2010) (May/June 2011)
12. (a) state and prove the properties of mutual information
(Nov/Dec 2011, Nov/Dec 2012, May/June 2013)
(b) Explain in detail adaptive Huffman coding with the help of an example "it is name". Apr/May 2009
13. Assume that the character set and probability are e = 0.3, n = 0.3, t = 0.2,

$w = 0.1$, $* = 0.1$. Derive the codeword value for the string “newt*”.
Explain how the decoder determines the original string from the received codeword value? (16) (Nov/Dec 2011,Nov/Dec 2012 ,May/June 2013)

14. A binary channel matrix is given as

	Y1	y2
X1	2/3	1/3
X2	1/10	2/10

Determine $H(X)$, $H(X/Y)$, $H(Y/X)$, AND $I(X, Y)$ IF $P(X1)=1/3$ and $P(X2)= 2/3$ (16)

15. Explain about psychoacoustic model.(16) Apr/May 2009