Exam.Code:0906
Sub. Code: 6260

2063

B.E. (Information Technology)

Second Semester

ESC-X08: Basic Information Theory and Communication

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

Q1

(a) What is the purpose of conditional probability? How it is useful for signal theory? (2)

(b) Differentiate between amplitude modulation and phase modulation. (2)

(c) Which digital transmission technique is better from BPSK and BFSK? Why? (2)

(d) Give applications of delta modulation. (2)

(e) What is coding efficiency? How it can be calculated? (2)

Part A

Q2 (a) What are random variables? Explain Bayes' Theorem with suitable example. (5)

(b) List the limitations of Binomial, Poisson and Normal distribution in signal theory? (5)

Q3 (a) From channel capacity theorem, find the capacity of a channel with infinite bandwidth and explain. (5)

(b) Define Entropy. Differentiate between Joint and Conditional Entropy. (5)

Q4 Given xi={x1, x2, x3, x4, x5, x6}with probabilities p(xi)= {0.3, 0.25, 0.2, 0.12, 0.08, 0.05}. Make Huffman code. Find efficiency of this code. (10)

Part B

Q5 (a) Find the carrier and modulating signal frequencies, the modulation index, and maximum deviation of FM signal represented by the following expression:

$$v(t) = 12\sin(6\times10^{8}t + 5\cos 1250t).$$

What power will this FM signal dissipate across a 10 Ω resistor? (5)

(b) Explain merits and demerits of frequency modulation. (5)

Q6 (a) Explain the block diagram of a pulse code modulation. How it is different from differential PCM? (5)

(b) Define modulation. Why is it required? Give demerits of PWM and PPM. (5)

Q7 (a) Derive the expression for ASK digital transmission technique. Compare MSK and ASK. (5)

(b) Explain the working of QPSK with suitable diagrams. (5)

x-x-x