2014
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 probability in signal theory?   (2)
(b) Differentiate between frequency modulation and phase modulation.   (2)
(c) Which digital transmission technique is better from BPSK and DPSK? Why? (2)
(d) Give applications of PCM.   (2)
(e) What is coding efficiency? How it can be calculated?   (2)

Part A

Q2 (a) What is Normal distribution? Compare it with Poisson distribution.

(5)

(b) What are the advantages of Bayes' Theorem? Also define the theorem.

(5)

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

(b) Differentiate between Joint and Conditional Entropy. How conditional entropy plays role in information theory?   (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 the concept of generation of phase modulation with suitable blocks. (5)

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

(b) Explain the generation of pulse position modulation. Why is it required? Give demerits of PPM.   (5)

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

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

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