

MODULE-2 Problems

1. A source generates three symbols with probabilities 0.25, 0.25 and 0.50 at a rate of 3000 symbols per sec.

Assuming independent generation of symbols, Calculate the average bit rate.

2. A continuous signal is bandlimited to 5kHz. The signal is quantized in 8 levels of a PCM with probabilities 0.25, 0.2, 0.2, 0.1, 0.1, 0.05 & 0.05. Calculate the entropy & the rate of information.

3. A certain RV has the cdf given by

$$\begin{aligned}F_x(x) &= 0 & x \leq 0 \\&= Kx^2 & 0 < x \leq 10 \\&= 100K & x > 10\end{aligned}$$

- i) Calculate the value of K.
- ii) Find the values of $P(x \leq 5)$ & $P(5 < x \leq 7)$
- iii) Plot the corresponding pdf.

4. A continuous RV has a pdf of

$$f(x) = Kx^2 e^{-x} \quad 0 < x \leq 1$$

Find the value of K, mean and variance.