THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY, PATIALA

Department of Electronics and Communication Engineering

UEC310 – Information and Communication Theory

TUTORIAL - 3

Q1	Suppose we have the following information: • There is a 60 percent chance that it will rain today. • There is a 50 percent chance that it will rain tomorrow. • There is a 30 percent chance that it does not rain either day. Find the following probabilities: a) The probability that it will rain today or tomorrow. b) The probability that it will rain today and tomorrow. c) The probability that it will rain today but not tomorrow. d) The probability that it either will rain today or tomorrow, but not both.
Q2	Find the range for each of the following random variables. a) I toss a coin 100 times. Let X be the number of heads I observe. b) I toss a coin until the first heads appears. Let Y be the total number of coin tosses. c) The random variable T is defined as the time (in hours) from now until the next earthquake occurs in a certain city.
Q3	Let X be a discrete random variable with the following PMF $$p_X(x) = \begin{cases} 0.1 & for\ x = 0.2 \\ 0.2 & for\ x = 0.4 \\ 0.2 & for\ x = 0.5 \\ 0.3 & for\ x = 0.8 \\ 0.2 & for\ x = 1 \\ 0 & otherwise \end{cases}$$ a) Find the range of the random variable X. b) Find $P(X \leq 0.5)$ c) Find $P(0.25 < X < 0.75)$. d) Find $P(X = 0.2 \mid X < 0.6)$.