Spring Semester, 2022
B.Tech-II, Semester-(IV)
Tutorial Sheet-2
MA- 212

Full Marks: 10
Instructor: Dr. Raj Kamal Maurya
Answer all of the following questions. All notations have their usual meanings.

1. Events A and B are such that $P(A \cup B) = \frac{3}{4}$, $P(A \cap B) = \frac{1}{4}$ and $P(\bar{A}) = \frac{2}{3}$. Show that $P(B) = \frac{2}{3}$ and $P(A \cap \bar{B}) = \frac{1}{12}$.

2. Each coefficient in equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary die. Find the probability that the equation will have (i) Real Root (ii) Complex Root.

3. Find the minimum number of times a die has to thrown such that the probability of no six is less than $\frac{1}{2}$.

4. Consider two boxes, one contating 1 black and 1 white marble, the other, 2 black and 1 white marble. A box is selected at random and a marble is drawn at random from the selected box. What is the probability that marble is black?

5. A problem is given to three students A, B and C whose chance of solving it are 1/2, 3/4 and 1/4 respectively. What is the probabilty that the problem is solved if all of them try independently?

6. We are interested in the proportion p of defective in a batch of manufactured articles. We draw a sample of 20 articles from the batch. Let X be the number of defective articles in the sample. Write the PMF of X. For p=0.3 find $P(X = 7)$, $P(X \leq 2)$ and compare them with approximate probability obtained through Poisson approximation.