Matrusri Engineering College

(An Autonomous institution)

Saidabad, Hyderabad-59

Partial Differential Equations, Probability & Statistics
Question Bank

UNIT-I

Short Answer questions:

1.Define Mutually Exclusive and Independent Events.

2. If A & B are independent events, then A' & B' are independent events.

3. Define probability density function

4. A card is drawn from a well shuffled pack of cards, what is the probability that it is red or king.

5. A fair coin is tossed six times. Find the probability of getting four heads.

6. A variable X has the following probability function.

x	-3	6	9
$p(x)$	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

Find $E(X)$.

7. A fair coin is tossed six times. Find the probability of getting four heads.

8.State and Prove Addition theorem for 2 events.

9.Define Conditional probability.

10.State Total probability theorem.

Long answer questions:

1.State & Prove Baye's theorem.

2. Urn I have 2 white ,3 black balls. Urn II has 4 white ,1 black ball and Urn III has 3 white, 4 black balls. An Urn is selected at random, and a ball is drawn at random is found to be white. Find the Probability that Urn I was selected.

3. For the continuous random variable X whose probability

density function is given by $f(x) = \begin{cases} cx(2-x), if\ 0 \le x \le 2 \\ 0, \qquad otherwise \end{cases}$

Find c, mean and variance of X.

4. A husband and wife appear in an interview for the same post. The probability of husband's selection 1/7 and that of wife's selection is 1/5.what is the probability that only one of them selected?

5. A random variable X has the following probability function

x	0	1	2	3	4	5	6	7
$p(x)$	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

i) Determine K ii) Evaluate $P(X < 6), P(X \ge 6)$

6. A continuous random variable has the probability

density function $f(x) = \begin{cases} k(1-x^2) & 0 < x < 1 \\ 0, & elsewhere \end{cases}$.

Find K & $P(x \ge 0.5)$.

7. A continuous random variable has the probability

density function $f_X(x) = Kx^2e^{-\lambda x}, x \ge 0, \lambda > 0$.Find K, Mean & Variance.

8. A Random variable X has the following probability distribution

x	-2	-1	0	1	2	3
$P(X = x)$	0.1	k	0.2	2k	0.3	k

Find Mean and Variance.

9. Box A contains 5 red, and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box. What is the probability that they are both of same colour.

10.A Can hit a target once in five shots. B can hit two targets in 3 shots. C can hit one target in 4 targets. What is the probability that 2 shots hit a target?

UNIT-II

Short Answer questions:

1. Define Skewness and Kurtosis.
2. Define Poisson distribution.
3. Write any two characteristics of Normal distribution.
4. Find the moment generating function of Binomial distribution.
5. The mean and variance of a binomial variable X with parameters $n\ and\ p\ are\ 16\ and\ 8$. Find $P(X \geq 1) and\ P(X \geq 2)$
6. Derive mean of Poisson distribution.
7. If 'X' is a Poisson variate $P(X = 1) = P(X = 2)$.Find P(X=0).

Long answer questions:

1. Six dice are thrown 729 times. How many times would you expect at least 3 dice to show 5 or 6.
2. Derive Moment generating function of Poisson distribution and hence find it's mean
3. A manufacturer knows that the condensers he makes contain on average 1% defective. He packs them in boxes of 100.What is the probability that a box picked at random will contain 3 or more faculty condensers.
4. If 3 of 20 tyres are defective and 4 of them are randomly chosen for inspection, what is the probability only one of the defective tyre will be included?
5. Derive Mean and Variance of normal distribution.