Unit-4

2021-22 University Paper(EVEN SEM)
Unit-4

1. A die is tossed twice, A success is getting 2 or 3 on a toss. Calculate mean 4

2. Write Statement of Baye's theorem.

3. In a test on 2000 electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and S.D of 60 hours. Calculate the number of bulbs likely to burn for: (i) More than 2150 hours, (ii) less than 1950 hours (iii) between 1920 hours and 2160 hours?
4. Two urns contain 4 white ,6 blue and 4 white, 5 blue balls respectively. One of the urns is selected at random and a ball is drawn from it. If the ball drawn is white. What is the probability that it was drawn from the (i) first urn (ii) second urn.
5. The following table gives the no. of days in a 50 day period during which automobile accidents occurred in a city.

No. of Accidents	0	1	2	3	4
No. of days	21	18	7	3	1

Fit a Poisson distribution to the data and calculate the theoretical frequencies.

2021-22 University Paper (ODD SEM)
Unit-4

1. Four persons are chosen at random from a group containing 3 men, 2 women and 4 children . Prove that the chance that exactly two of them will be children is 10/21.
2. If the probability density function $f(x)=\begin{cases} kx^3, & if\ 0\le x\le 3 \\ 0, & elsewhere \end{cases}$, find the value of k . Also find the probability between $x=\frac{1}{2}$ and $x=\frac{3}{2}$.

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3. In a sample of 1000 cases , the mean of a certain test is 14 and S.D is 2.5. Assuming the distribution to be normal find .

(i) How many scores between 12 and 15?

(ii) How many scores above 18?

(iii) How many scores below 8?

$$Given\ f(0.8) = 0.2881,\ \ f(0.4) = 0.1554\ , f(1.6) = 0.4552,\ \ \ f(2.4) = 0.4918$$

4. Fit a binomial distribution for the following data and compare the theoretical frequencies with actual ones

x	0	1	2	3	4	5
f	2	14	20	34	22	8

5. The number of accidents in a year involving taxi drivers in a city a poisson distribution with mean equal to 3 Out of 1000 taxi drivers, find approximately the number of drivers such that

(i) No accident in a year

(ii) More than three accidents in a year.

$$Given\ e^{3} = 0.04979$$

2020-21 University Paper
Unit-4

1. Identify the following statement is true or false "For a Binomial Distribution mean is 6 and variance is 9.
2. If the function is defined by $f(x) = ce^{-x}, 0 < x < \infty$ calculate the value c which changes to $f(x)$ to a probability density function.
3. Show that Poisson Distribution is the limiting form of binomial distribution when p and q is very small and n is large enough.
4. A sample of 100 dry battery cells tested to find the length of life produced the following results $\bar{x} = 12\ \ hours, \sigma = 3\ hours.$ Assuming the data to be normally distributed , what percentage of battery cells are expected to have (i) more than 15 hours (ii) less than 6 hours (ii) less than 6 hours (iii) between 10 and 14 hours.
5. State Baye's Theorem. The contents of urns I,II and III are as follows :1 white, 2 black, and 3 red balls ; 2 white , 1 black and 1 red balls ; 4 white, 5 black and 3 red balls . One urn is chosen at random and two balls drawn. They happen to be white and red . Wha is the probability that they come from urn I?

Unit-4

2019-20 University Paper
Unit-4

1. If the PMF of a discrete random variable

x	1	2	3
$f(x)$	1/2	1/3	1/6

Determine $E(x)$ and $V(x)$.

2. If the probability density function $f(x)$ of a continuous random variable is X defined as

$$f(x)=\begin{cases}\dfrac{A}{x^2}, & if\ 5\le x\le 10\\ 0, & elsewhere\end{cases}$$

, find the value of A .

3. Find the mean of the Binomial distribution $B(4,\frac{1}{3}).$

4 Fit a Poisson distribution to the following data which give the number of yeast cells per square for 400 squares

x	0	1	2	3	4	5	6	7	8	9	10
f	103	143	98	42	8	4	2	0	0	0	0

It is given that $e^{-1.52}$=0.2674.

5 State the Bayes' theorem. The probability that a civilian can hit a target is 2/5 and the probability that an army officer can hit the same target is 3/5. While the civilian can fire 8 shots in the time, the army officer fires 10 shots. If they fire together, then what is the probability that army officer shoots the target?

6 Define the Normal distribution. The daily wages of 1000 workers are distributed around a mean of Rs. 140 and with a standard deviation of Rs. 10. Estimate the number of workers whose daily waged will be (i) between Rs. 140 and Rs. 144, (ii) less than Rs. 126 (iii) more than Rs. 160.