BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
Computer Science & Engineering
B. Tech. Sem - II :SUMMER : 2023
SUBJECT : PROBABILITY & STATISTICS

Day : Friday | Time : 10:00 AM-01:00 PM

Date : 26-05-2023 | **S-24025-2023** | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Use of non-programmable calculator is **allowed**.
4) Assume suitable data **WHEREVER** necessary.
5) Draw neat labeled diagrams **WHEREVER** necessary.

Q.1 In a bolt factory machines A, B & C manufacture respectively 25%, 35% % 40% of the total production. Of their output 5,4 & 2 percent are defective bolts. A bolt is drawn at random from the production and is found to be defective. What is the probability that it was manufactured by machines A, B & C? **(10)**

OR

Q.1 One bag contains 4 white and 2 black balls. Another contains 3 white and 5 black balls. If one ball is drawn from each bag, find the probability that - **(10)**

i) both are white
ii) both are black
iii) one is white and one is black.

Q.2 If X and Y are two random variables having joint density function. **(10)**

$$f(x,y)=\begin{cases}\frac{1}{8}(6-x-y); & 0\le x<2,\quad 2\le y<4\\ 0 & \text{otherwise}\end{cases}$$

Find –

i) $P(X<1\cap Y<3)$
ii) $P(X+Y<3)$
iii) $P(X<1/Y<3)$.

OR

Q.2 A random variable X is distributed at random between the values 0 & 1 so that its probability density function $f(x)=Kx^2(1-x^3)$, where K is const. Find the value of K, the mean and standard deviation of the distribution. **(10)**

Q.3 A manufacturer who produces medicine bottles, finds that 0.1% of the bottle are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacture buys 100 boxes from the producer of bottles. Using poisson distribution, find how many boxes will contain - **(10)**

i) No defective
ii) at least two defectives.

OR

Q.3 X is normally distributed and the mean of X is 12 & S.D. is 4. **(10)**

a) Find out the probability of the following : i) $X\ge 20$ ii) $X\le 20$ iii) $0\le X\le 12$.
b) Find x', when $P(X>x')=0.24$.

PTO

Q.4 Two ladies were asked to rank 10 different types of lipsticks. The ranks given by them are as follows: **(10)**

Lipsticks :	A	B	C	D	E	F	G	H	I	J
Neeta :	1	2	3	4	5	6	7	8	9	10
Neena :	3	1	4	2	6	9	8	10	5	7

Calculate Spearman's rank correlation coefficient.

OR

Q.4 Given total of the product of deviation of X & Y Series = 3,044, No. of pairs of observations = 10, Total of the deviations of X series = –170, total of the deviations of Y series = –20, total of the squares of deviations of X series = 8288, total of the squares of deviations of y series = 2264. Find out the coefficient of correlations. **(10)**

Q.5 Fit an exponential curve of the form $Y = ab^x$ to the following data : **(10)**

X:	1	2	3	4	5	6	7	8
Y:	1.0	1.2	1.8	2.5	3.6	4.7	6.6	9.1

OR

Q.5 Obtain the equations of two lines of regression for the following data : **(10)**

X:	6	2	10	4	8
Y:	9	11	5	8	7

Q.6 The following data represents the study hours / day by four different students on 3 different days **(10)**

Days	A	B	C	D
Monday	2	3	4	5
Tuesday	4	4	6	6
Wednesday	6	5	8	8

a) Test whether the study hours of the different students are same?
b) Test whether the study hours on different days are same?
(Tabulated F values : $F_{0.05}(6,3) = 4.76$, $F_{0.05}(6,2) = 5.14$)

OR

Q.6 In trivariate distribution $\sigma_1 = 2, \sigma_2 = \sigma_3 = 3, r_{12} = 0.7, r_{23} = r_{31} = 0.5$ find i) $r_{23.1}$ ii) $R_{1.23}$ iii) $b_{12.3}$, $b_{13.2}$. **(10)**

*****