

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - I Computer Science & Business System : WINTER : 2023
SUBJECT : STATISTICS, PROBABILITY & CALCULUS

Day : Monday

Time : 10:00 AM-01:00 PM

Date : 04-12-2023

W-24131-2023

Max. Marks : 60

N.B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of **CALCULATOR** is allowed.
- 4) Draw neat diagram **WHEREVER** necessary.

Q.1 What are the requirements of a good sample? (10)

OR

Q.1 What are the methods of collecting primary data? (10)

Q.2 Ten participants in a contest are ranked by two judges as follows: (10)

X	1	5	6	10	3	2	4	9	7	8
Y	6	9	4	8	1	2	3	10	5	7

Find the rank correlation coefficient

OR

Q.2 In a partially destroyed laboratory record, only the lines of regression are available as $4x - 5y + 33 = 0$ and $20x - 9y = 107$. (10)

Calculate \bar{x} , \bar{y} and the coefficient of correlation between x and y

Q.3 A coin is tossed until a head appears. What is the expectation of the number of tosses required? (10)

OR

Q.3 Find the moment generating function of $f(x) = \alpha e^{-\alpha x}$; $x, \alpha > 0$ (10)

Q.4 In a sampling a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain at least 3 defective parts. (10)

OR

Q.4 If a random variable has a Poisson distribution such that $P(1) = P(2)$, Find mean and $P(4)$ (10)

Q.5 Solve: $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}} \right) \frac{dx}{dy} = 1$ (10)

OR

Q.5 Solve: $3(x - x^3)y^2 \frac{dy}{dx} + (2x^2 - 1)y^3 = ax^3$ (10)

Q.6 Change the order of integration $\int_{-a}^a \int_0^{\sqrt{a^2 - y^2}} f(x, y) dx dy$ (10)

OR

Q.6 Evaluate $\int_0^a \int_y^a \frac{x dx dy}{x^2 + y^2}$ (10)

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