BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - II Computer Science & Engineering- AL & ML : WINTER : 2023

SUBJECT : PROBABILITY & STATISTICS

Day : Tuesday

Date : 21-11-2023

W-23930-2023

Time : 10:00 AM-01:00 PM

Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** allowed.
4) Assume suitable data if necessary.

Q.1 A can hit a target 3 times in 5 shots, B2 times in 5 shots and C 3 times in 4 shots. They fire a volley. What is the probability that **(10)**

i) two shots hit

ii) atleast one shot hit?

OR

Q.1 Machines M_1, M_2 and M_3 manufactures identical items. Of their respective output 5%,4% and 3% of items are faulty. On a certain day, M_1 manufactured 25% of the total output, M_2 has manufactured 30% and M_3 the remainder. An item selected at random is found to be faulty. What is the probability that it was manufactured by the machine with the highest output? **(10)**

Q.2 A continuous random variable X with p.d.f. $f(x) = 3x^2$, $0 \le x \le 1$ **(10)**

1) Verify that f(x) is p.d.f.
2) Find a and b such that: i) $P(x \le a) = P(x > a)$ ii) $P(x > b) = 0.05$

OR

Q.2 A continuous random variable X with p.d.f. $f(x) = Kx^2(1-x^3)$, where K is a constant. Find the value of K, mean and variance. **(10)**

Q.3 Let X is normal variate with mean 30 and S.D. 5. Find the probabilities that **(10)**

i) $26 \le X \le 40$ ii) $X \ge 45$ iii) $|X-30| > 5$

(Given: $A_{z=0.8}=0.2881$, $A_{z=2}=0.4772$, $A_{z=3}=0.4986$, $A_{z=1}=0.3413$)

OR

Q.3 The following data due to Weldon shows the results of throwing 12 fair dice 4,096 times, a throw of 4, 5 or 6 being called success. **(10)**

Success	0	1	2	3	4	5	6	7	8	9	10	11	12
Frequency	-	7	60	198	430	731	948	847	536	257	71	11	-

Fit a binomial distribution and find the expected frequency.

P.T.O.

Q.4 Calculate the coefficient of correlation between X and Y for the following: **(10)**

X	1	3	4	5	7	8	10
Y	2	6	8	10	14	16	20

OR

Q.4 Find spearman's rank coefficient of correlation from the following data: **(10)**

X	50	66	34	21	15	79	42
Y	51	64	53	41	17	73	29

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

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

OR

Q.5 Obtain the equations of two lines of regression for the following data. Also obtain the estimate value of X for Y= 70. **(10)**

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

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

OR

Q.6 The following 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?
(Given: $F_{0.05}(6,3) = 4.76$, $F_{0.05}(6,2) = 5.14$)

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