BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II Computer Science & Engineering AI & ML : WINTER: 2025
SUBJECT: PROBABILITY & STATISTICS

Day : Friday
Date : 28/11/2025

W-27703-2025

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** is allowed.
4) Assume suitable data if necessary.

Q.1 A can hit the target 1 out of 4 times, B can hit the target 2 out of 3 times, C can hit the target 3 out of 4 times. Find the probability of atleast two hit the target. **[10]**

OR

Q.1 Three machines M_1, M_2 and M_3 produce identical items. Of their respective output 5%, 4% and 3% of items are faulty. On a certain day M_1 has produced 25% of the total output, M_2 has produced 30% and M_3 the remainder. An item selected at random is found to be faulty. What are the chances that it was produced by the machine with the highest output? **[10]**

Q.2 Find the probability distribution of the total number of dots obtained by throwing two unbiased dice at random. Hence, find the expected number of total. **[10]**

OR

Q.2 Find k for which $f(x)$ represents pdf, where **[10]**

$$f(x)=\begin{cases} kx & , \quad 0<x\le\frac{1}{2} \\ \frac{1}{2}kx^2-1, & \frac{1}{2}<x\le 1 \end{cases}$$

Q.3 On an average a box containing 10 articles is likely to have 2 defectives. If we consider a consignment of 100 boxes, how many of them are expected to have three or less defectives? **[10]**

OR

Q.3 In a certain examination test, 2000 students appeared in a subject of statistics. Average marks obtained were 50% with standard deviation 5%. How many students do you expect to obtain more than 60% of marks, supposing marks are distributed normally? (Given : $A_{z=2} = 0.4772$) **[10]**

Q.4 Following are the values of import raw material and export of finished product in suitable units: **[10]**

Export	10	11	14	14	20	22	16	12	15	13
Import	12	14	15	16	21	26	21	15	16	14

Calculate coefficient of correlation between the import values and export values.

OR

P.T.O.

Q.4 A football team of eleven players are adjudged by two judges as follow. Find the rank correlation between judgements: [10]

Players	A	B	C	D	E	F	G	H	I	J	K
Judges I	11	9	4	3	1	6	2	5	7	8	10
Judges II	10	11	5	3	2	7	1	4	6	8	9

Q.5 Obtain regression lines for the following data: [10]

X	2	3	5	7	9	10	12	15
Y	2	5	8	10	12	14	15	16

Find estimate of : i) Y when $X = 6$ ii) X when $Y = 20$

OR

Q.5 If the two lines of regression are $9x + y - \lambda = 0$ and $4x + y = \mu$ and the means of x and y are 2 and -3 respectively, find the values of λ, μ and coefficient of correlation between x and y. [10]

Q.6 If from an observed data, it is found that $r_{12} = 0.4$, $r_{23} = 0.8$ and $r_{31} = 0.3$. Find multiple correlation $R_{1.23}$ and $R_{3.21}$. [10]

OR

Q.6 The following data represents the study hours/day by four different students on 3 different days: [10]

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

i) Test whether the study of the different students are same?
ii) 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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