

Total No. of Question : [4]

Registration No. :

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Programme Name : Computer Science & Engineering(AI ML)

Regular S.Y.B.Tech.Sem.IV ESE May / June 2023

IV SEMESTER (2021 BATCH)

201AIMLL210-Probability and Statistics

Duration : 2 Hours

Marks : 50

Instructions :

(Q1) All questions are compulsory [20.0]

(1.1) Calculate standard deviation for the following data [5.0]

Class Interval:	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency :	20	130	220	70	60

(1.2) The following is a two by two contingency table [5.0]

Eye Colour in Father	Eye Colour in Son	
	Not Light	Light
Not Light	23	15
Light	15	47

Test whether the eye colour in son is associated with eye colour in father.

(Given Table value of Chi square at 5% level of significance is 11.07)

CO :- C210.2

Blooms Taxonomy :- Apply

(1.3) Calculate the Karl Pearson's coefficient of correlation for the following bivariate data [5.0]

x : 28 45 40 38 35 33 40 32 36 33
 y : 23 34 33 34 30 26 28 31 36 35

CO :- C210.3

Blooms Taxonomy :- Apply

(1.4) [5.0]

Compute the linear regression and estimate the value of x when $y = 10$ for the following data

	Variable x	Variable y
Mean	8.2	12.4
S.D	6.2	20

Coefficient of correlation $r = 0.9$

CO :- C210.3

Blooms Taxonomy :- Apply

(Q2) Attempt **Any Two** of the Following

[10.0]

- (2.1) In a sample of 1000 students, the mean and standard deviation of marks obtained by the engineering students in Probability and Statistics course are 14 and 2.5. Assuming the distribution to be normal calculate the number of students getting marks

[5.0]

1. Between 12 and 15

2. Above 18

3. Below 8

(S. N. V. z area between $z = 0$ and $z = 0.4$ is 0.1554, that between $z = 0$ and $z = 0.8$ is 0.2881, that between $z = 0$ and $z = 1.6$ is 0.4452 and that between $z = 0$ and $z = 2.4$ is 0.4918)

- (2.2) In a certain factory turning out blades, there is a small change $1/500$ for any blade to be defective. The blades are supplied in a pack of 10. Using Poisson distribution calculate

[5.0]

(i) No defective blades

(ii) One defective blades

(iii) Two defective blades

- (2.3) From a box containing 100 transistors 20 of which are defective, 10 are selected at random. Calculate the probability using binomial distribution that

[5.0]

(i) All will be defective

(ii) All are non-defective

(Q3) Attempt **Any Two** of the Following

[10.0]

- (3.1) Solve the homogeneous recurrence relation

[5.0]

$$a_r - 9a_{r-1} + 20a_{r-2} = 0$$

CO :- C210.5

Blooms Taxonomy :- Apply

(3.2) Solve the non-homogeneous recurrence relation

[5.0]

$$a_r - a_{r-1} - 6 a_{r-2} = -5999$$

CO :- C210.5

Blooms Taxonomy :- Apply

(3.3) Compute the characteristic equation and characteristic roots of recurrence relation [5.0]

$$a_r - 5a_{r-1} + 6a_{r-2} = 0$$

CO :- C210.5

Blooms Taxonomy :- Apply

(Q4) Attempt **Any Two** of the Following

[10.0]

(4.1) Fit a straight line $y = a + bx$ to the following data [5.0]

$x:$ 0 5 10 15 20 25

$y:$ 12 15 17 22 24 30

CO :- C210.3

Blooms Taxonomy :- Apply

(4.2) Fit a curve of the form $y = ab^x$ to the following data [5.0]

$x:$ 1 2 3 4 5 6 7 8

$y:$ 1 1.2 1.8 2.5 3.6 4.7 6.6 9.1

CO :- C210.3

Blooms Taxonomy :- Apply

(4.3) Fit second degree parabolic curve to the following data [5.0]

$x:$ 0 1 2 3 4

$y:$ 1.0 1.5 1.5 2.5 3.5

CO :- C210.3

Blooms Taxonomy :- Apply
