JHARKHAND Rai University RANCHI

End Semester/Reappear (Semester V) Examination December, 2024

Programme: B.Tech (MiE) **Full Marks: 70**
Course: Numerical and Statistical Method **Time: 3 Hrs.**
Course Code: 8PCCMiE305
Enrolment no. _____

Section I

1. **Short Answer type questions.** **4 x 5 = 20**
   a. Using the Bisection method, to find a positive root of the equation $x^2 + 2x - 2 = 0$ up to two approximations. (CO1 Apply)

   or

   Solve the positive root of the equation $x^2 + 2x - 2 = 0$, correct up to two significant figures by theNewton – Raphson method. (CO1 Apply)

   b. Define the Newton's forward and backward formula for first and second derivative. (CO2 Remember)

   or

   Explain the various difference operators with symbols and relations between them. (CO2 Understand)

   c. An Urn A contains 5 white and 8 red balls and an Urn B contains 7 white and 9 Red balls. One ball is drawn at random from one of the urns and is found to be white. Find the probability that it was drawn from urn A (CO3 Understand)

   or

   Solve the a random variable X takes on the values -3, -1, 2, and 5 with respective probability $\frac{2k-3}{10}, \frac{k+1}{10}, \frac{k-1}{10}, \frac{k-2}{10}$. Determine the distribution of X. (CO3 Apply)

   d. Explain the Regression line. (CO4 Understand)

   or

   Define co-efficient of correlation and write the Kar Pearson formula. (CO4 Remember)

Section II

Long Answer type questions. **3 x 10 = 30**

2. Find coefficient of correlation from following series of marks secured by 10 students in a class test inMathematics and NSM. (CO4 Apply)

Marks in Math	45	70	65	30	90	40	50	75	85	60
Marks in NSM	35	90	70	40	95	40	60	80	80	50

or

Recommend the Ten competitors in a beauty contest are ranked by three judges:

Judge I	1	6	5	10	3	2	4	9	7	8
Judge II	3	5	8	4	7	10	2	1	6	9
Judge III	6	4	9	8	1	2	3	10	5	7

Use the rank correlation co – efficient to determine which pair of judges has the nearest approach to common tastes in beauty. (CO4 Evaluate)

3. Calculate f (0.23) and f (0.29) from given table. (CO2 Apply)

X	0.20	0.22	0.24	0.26	0.28	0.30
f(x)	1.6596	1.6698	1.6804	1.6912	1.7024	1.7139

or

Find dy/dx at x = 2 for the function y= f(x) given in the table: (CO2 Analyse)

X	1	2	3	4	5	6
f(x)	2.7183	3.3210	4.0552	4.953	6.0496	7.3891

4. A bolt factory machines A,B, and C manufacture respectively 25%, 35% and 40% of the total. If their output 5, 4 and 2 per cent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine B. (CO3 Apply)

or

Calculate the probability distribution of 3 success from a total of 10 independent trials where the probability of success on each trial is 0.3. (CO3 Apply)

Section III

Application based questions. **1 x 20 = 20**

5. Analyse the positive root of the equation $x^3 - 2x - 5 = 0$, correct up to two significant figures by the Newton – Raphson Method. (CO1 Analyze)

or

Evaluate by the Using Gauss – Seidel Method

$20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$. (CO1 Evaluate)

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