

Numerical & Statistical Methods

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SUBJECT: Numerical and Statistical Methods

CLASS: F.Y.B.Sc.(IT)

17.5.22

SEM-II

SECTION II

40 MARKS



- Note: 1. All questions are compulsory with internal choices
 2. Use of any calculator is allowed.
 3. Each question carry equal marks

Q. 2 Attempt any one.

A) I) Find the absolute and relative error and also determine number of significant digits in the approximations of the following

True value of $x=2.71828182$

Approximate value of $x=2.7182$

II) Round following number to three significant digits

- I) 48.46238 ii) 0.80089 iii) 2.3643 iv) 3.0101209

B). Solve the equation $x^3+3x^2-3=0$ using Newton Raphson method correct up to 4 decimal places.

$x=2$ Do till three iterations

Q.3 Attempt Anyone.

A. i) Find Approximate root of equation $f(x) = x^2 - 3x + 1 = 0$ by bisection method. Assume accuracy of 0.01

ii) Use the method of false position to find the root of the equation $x^3 - x - 4 = 0$ and perform only 3 iterations.

B. Find the missing entries in the following table: - using Newton's forward difference interpolation formula or Lagrange's Interpolation formula.

x	2	4	5	6	7	8
f(x)	4	7	-	11	-	18

Q.4 Attempt Anyone.

A. Solve the following linear equations using Gauss Jordan Method

$$x+y+z=90, 2x+3y+6z=370, 3x-8y-4z=-340$$

B. Evaluate following integral using Trapezoidal rule

$$\int_0^6 \frac{1}{1+x^2} dx$$

Q.5 Attempt Anyone.

A. Solve Graphically: A company manufactures two model of Jeeps A & B. To stay in business it must produce at least 50 Jeeps of model A per month. It also does not have the facilities to produce more than 150 Jeeps of model B per month. The total demand for both the models does not exceed 200 per month. The profit on each Jeep of model A & model B are Rs. 40,000/- and Rs. 60,000/- respectively

B. Find the regression of marks in paper II on marks in paper I from the following data:-

Marks in Paper I :	80	45	50	60	60	48	59	70
Marks in Paper II:	85	60	60	61	58	55	55	75

Estimate the marks in paper II of a student who gets 54 marks in paper I. Also find other regression equations to estimate marks of paper I if marks of paper II are given.

Q.6 Attempt Anyone.

A. If a random variable X has the density function given by

$$f(x) = Ax^3 \text{ when } 0 \leq x \leq 1$$

$$= 0 \quad \text{otherwise}$$

Find the value of A, hence find the probability that

- i. X lies between 0.2 to 0.5
- ii. X is less than 0.3

It is known that system will fail at any given day is 0.1. Suppose we observe the system for five days, what is probability number of days system will fail in five observed days is:

- i. Nil
- ii. Two

B. If a random variable X follows Poisson distribution with probability mass function:

$$f(x) = \frac{e^{-\lambda} \lambda^x}{x!}$$
$$= 0$$

When $x = 0, 1, 2, 3, \dots$

otherwise



Show that Mean of Poisson distribution is λ .

Further from past data if it known that average (Mean) number of flights getting delayed is 4 per day. Find the probability that on a random day, the probability of number of flights getting delayed is: **Given:** $e^{-4} = 0.0183$

- i. Exactly 1
- ii. At least 1