MATH242   Enrol. No. ..A2305220(5)..
[ST]

SUPPLEMENTARY EXAMINATION : July – August, 2023

APPLIED MATHEMATICS – IV

Time : 3 Hrs.   *Maximum Marks : 60*

Note: *Attempt questions from all sections as directed.*
Use of scientific calculator is allowed.

SECTION – A   (24 Marks)

Attempt any **four** *questions out of* **five**.
Each question carries **06** *marks*.

1. Find the approximate root of $x \log_{10} x - 1.2 = 0$, correct up to three decimal places.

2. Compute the values of $\int_{0.2}^{1.4}\left(\sin x - \log x + e^x\right)dx$ using Simpson's 3/8th rule.

3. Six dice are thrown together at a time, the process is repeated 729 times. How many times do you expect at least three dice to have 4 or 6?

P.T.O.

4. Calculate the first four moments about the mean of the following data :

x	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

5. Fit a straight line to the following data taking y as dependent variable

x	0	1	2	3	4
y	1.0	1.8	3.3	4.5	6.3

SECTION – B   (20 Marks)

Attempt any **two** *questions out of* **three**.

Each question carries **10** *marks*.

6. Solve the following system of equations using Gauss Seidal method.

$$10x + 2y + z = 9$$

$$2x + 20y - 2z = -44$$

$$-2x + 3y + 10z = 22$$

7. Find the value of $y(1.1)$ using Runge-Kutta method,

   given that $\dfrac{dy}{dx} = y^2 + xy$, $y(1) = 1$, taking $h = 0.05$.

8. (a) In an intelligence test administered to 1000 students the average score was 42 and standard deviation 24. Find the value of score exceeded by the top 100 students and the number of students exceeding a score of 50.   (6)

   (b) Construct the difference table and find value of $\Delta^2 f(3)$.   (4)

x	0	1	2	3	4	5	6
y	0	4	22	90	268	640	1314

SECTION – C   (16 Marks)
(Compulsory)

9. (a) From the following table of half-yearly premium for policies maturing at different ages, estimate the premium for policies maturing at age of 46.

Age	45	50	55	60	65
Premium	114.84	96.16	83.32	74.48	68.48

    (10)

P.T.O.

(b) A curve passes through the point $(0,18)$, $(1,10)$, $(3,-18)$ and $(6,90)$. Find the slope of the curve at $x=2$.   (6)