CLASS: BTECH   SEMESTER: VII
BRANCH: ALL   SESSION: MO/2022

SUBJECT: MA428 NUMERICAL AND STATISTICAL METHODS

TIME: 2 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q1	(a)	Find a positive root of the equation $xe^x = 1$, which lies between 0 and 1 by bisection method.	[2]	1	3
Q1	(b)	Using Newton-Raphson method, establish the iterative formula $$x_{n+1} = \frac{1}{2}\left(x_n + \frac{N}{x_n}\right)$$ to calculate the square root of N. Hence find the square root of 8.	[3]	1	3

Q2 (a) Find the missing term in the following data.   [2]   2   3

$x:$	0	1	2	3	4
$y:$	1	3	9	?	81

Q2 (b) If l_x represents the number of persons living at age x in a life table, find as   [3]   2   3
accurately as the data will permit the value of l_{47}. Given that $l_{20} = 512$,
$l_{30} = 439$, $l_{40} = 346$, $l_{50} = 243$.

Q3 (a) Find $f'(0.4)$ from the following table :   [2]   2   4

x	0.4	0.5	0.6	0.7	0.8
$f(x)$	1.583	1.797	2.044	2.327	2.651

Q3 (b)   [3]   2   3
Find the value of the integral $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}$ and $\frac{3}{8}$
Rule. Hence obtain the approximate value of π in each case.

Q4	(a)	Solve the system of equations 2x+y+z=10, 3x+2y+3z=18, x+4y+9z=16 by Gauss elimination method.	[2]	1	2
Q4	(b)	Starting with initial vector (x,y,z)=(0,0,0) perform three iteration oi Gauss-Seidel method to solve the following system of equations: 2x-y=7, -x+2y-z=1, -y+2z=1.	[3]	1	2

Q5	(a)	Find the root of $x^3 + x - 1 = 0$ by fixed point iteration method.	[2]	1	5
Q5	(b)	Show that $\nabla - \Delta = \Delta\nabla$	[3]	2	4