Question Paper Code: R15A21HS01

R15

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, Jan/Feb–2024

MATHEMATICS - III

(COMMON TO CIVIL & MECH)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (10 Marks)

Answer All Questions	Course Outcome	B.T Level	Marks
1. Perform two iterations to find a positive root of the equation $x^3-2x-5=0$ using bisection method.	CO1	L1	2M
2. Find the square root of 24 using Newton-Raphson method correct to 4 decimal places.	CO1	L2	3M
3. Prove that $(1+\Delta)(1-\nabla)=1$	CO2	L2	2M
4. Find the missing term in the following table:	CO2	L1	3M
5. Write the formula for Simpson's 3/8 rule.	CO3	L1	2M
6. Fit a straight line of the form y = ax +b for the data below:	CO3	L1	3M
7. Using Picard's method, find a solution of $\frac{dy}{dx}=1+xy,\ y(0)=0$ upto the second approximation.	CO4	L2	2M
8. State Adam's predictor-corrector formulae for solving the differential equation $\frac{dy}{dx}=f(x,y),\ y(x_0)=y_0$	CO4	L1	3M
9. Form the partial differential equation from $2z=\frac{x^2}{a^2}+\frac{y^2}{b^2}$	CO5	L2	2M
10. Solve the partial differential equation $yq-xp=z$	CO5	L2	3M

x	0	1	2	3	4
y	1	3	9	-	81

x	0	1	2	3
y	2	5	8	11

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Find the real root of the equation $x\log_{10}x=1.2$ by regula-falsi method correct to four decimal places.	CO1	L3	10M
	OR			
B)	Solve the system of equations by Gauss-Seidel method: $10x+2y+z=9;\ 2x+20y-2z=-44;\ -2x+3y+10z=22$	CO1	L3	10M
12. A)	From the following table, find the value of $e^{1.17}$ using Gauss's forward formula:	CO2	L3	10M
	OR			
B)	Find the polynomial f(x) and hence find f(3) using Lagrange's interpolation formula for the data:	CO2	L3	10M

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
e^x	2.7183	2.8577	3.0042	3.1582	3.3201	3.4903	3.6693

x	0	1	2	5
y	2	3	12	147

13. A)	Compute $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal and Simpson's rule with h = 0.125.	CO3	L3	10M
	OR			
B)	Fit a second degree polynomial of the form $y = a + bx + cx^2$ for the data:	CO3	L3	10M

x	1	2	3	4	5	6
y	2.4	3.1	3.5	4.2	5.0	6.0

14. A)	Using Euler's modified formula, find an approximate value of y when x = 0.2 in two steps, given that $\frac{dy}{dx} = x^2 + y,\ y(0) = 1.$	CO4	L3	10M
	OR			
B)	Using Runge-Kutta fourth order formula, compute y at x = 0.2 and 0.4 given that $\frac{dy}{dx} = x - y^2,\ y(0) = 0.$	CO4	L3	10M
15. A)	i) Solve $p(1+q) = qz$ ii) Solve $p - x^2 = q + y^2$	CO5	L3	5M 5M
	OR			
B)	By the method of separation of variables, find the solution of the equation $4\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u,\ u(0, y) = e^{-5y}$	CO5	L3	10M