2-2-M1

Mahindra University Hyderabad

École Centrale School of Engineering

Minor-I Exam

SE23UCAM020

Program: B. Tech. **Branch: AI, CM, CE, CSE, ECM, NT, BTCM** **Year: II** **Semester: II**

Subject: Numerical Methods (MA2208)

Date: 24/02/2025 **Start Time: 10:00 AM**

Time Duration: 1.5 Hours **Max. Marks: 20**

Instructions:

1) Answer all the questions.
2) All questions are self-explanatory; no clarification will be provided during the exam.
3) Use of non-programmable scientific calculator is allowed. However, sharing calculators during exams is strictly prohibited.

Course outcomes (COs)

CO 1: Solve non-linear and transcendental equations using various numerical methods, emphasizing order and convergence analysis.

CO 2 : Solve linear systems using direct and iterative schemes.

CO 3: Utilize interpolation techniques and different numerical integration methods and understand their application in various scenarios.

CO 4: Apply single-step and multi-step methods to numerically solve differential equations.

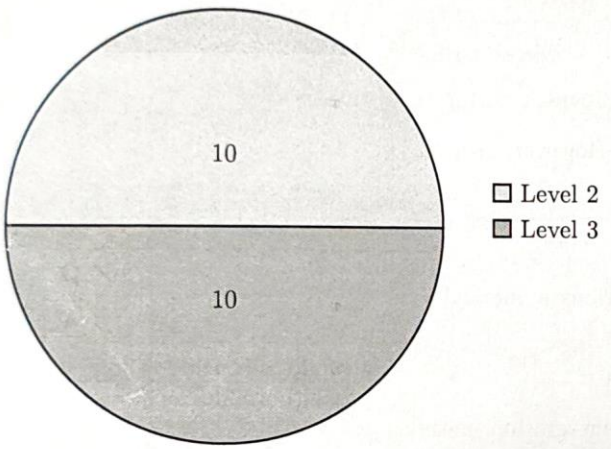
CO 5: Develop Computational Skills: Utilize MATLAB programming to implement numerical algorithms for solving various equations and problems.

Q.No.	Questions	Marks	CO	BL	PO	PI Code
1	Find the root of $f(x) = x^3+2x^2-x-1$ using Newton-Raphson method starting with initial guess as 0. Perform three iterations.	5	CO1	L3	PO1	1.2.2
2	A 64-bit number is stored in the machine in the following format (IEEE 754 double-precision floating-point). Identify the number in decimal form. $0\ 10000000001\ \underbrace{11000000\ldots0}_{52\text{ bits}}$	5	CO1	L2	PO1	1.2.2
3	Let $x = \zeta$ be the solution of $x^4 - 3x^2 + x - 10 = 0$. Find the order of convergence for the iterative method $x_{n+1} = 10 - x_n^4 + 3x_n^2$.	5	CO1	L2	PO1	1.2.2

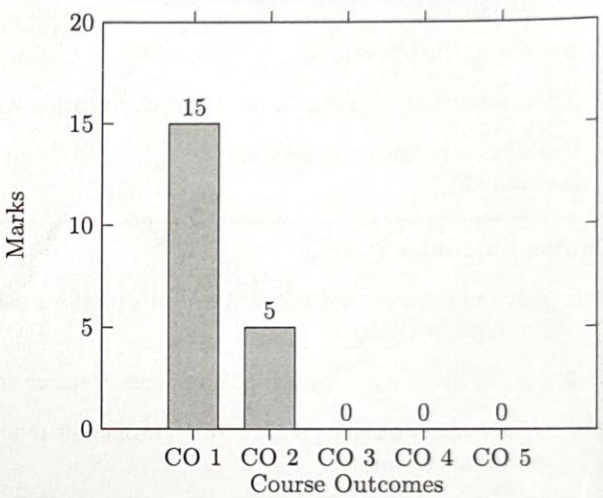
P.T.O.

Q.No.	Questions	Marks	CO	BL		
4	Solve the following system of linear equations using Gaussian elimination method. $4x_1 + x_2 - x_3 = -2$ $5x_1 + x_2 + 2x_3 = 4$ $6x_1 + x_2 + x_3 = 6$	5	CO2	L3	PO1	1.2.

Bloom's Level wise Marks Distribution



Course Outcome wise Marks Distribution



BL – Bloom's Taxonomy Levels:
1 – Remembering, 2 – Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 – Creating
CO – Course Outcomes
PO – Program Outcomes
PI Code – Performance Indicator Code

End of exam