

2018

MCA 2nd Semester Examination

NUMERICAL METHODS LAB.

PAPER—MCA-208

Subject Code—32

(Practical)

Full Marks : 100

Time : 3 Hours

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Illustrate the answers wherever necessary.*

Answer any two questions

2×35

1. Write a C program to find
- $f(7.5)$
- from the table

x	1	2	3	4	5	6	7	8
f(x)	1	8	27	64	125	216	343	512

Using Newton's Backward interpolation formula.

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2. Write a C program to find
- $\int_0^1 (4x - 3x^2) dx$
- using Simpson's
- $\frac{1}{3}$
- rule with 10 intervals.

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3. $3x_1 + 18x_2 + 9x_3 = 18$

$2x_1 + 3x_2 + 3x_3 = 117$

$4x_1 + x_2 + 2x_3 = 283$

Write a C program to solve the above system of equations using Gauss-Jordan method.

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(Turn Over)

4. Write a C program to find the root of the equation $f(x) = x^3 - 4x - 9 = 0$ using Bisection method.

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5.

x	5	6	9	11
f(x)	12	13	14	16

Write a program in C to compute $f(10)$. Using Lagrange's interpolation formula.

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6. Write a program to calculate $\int_0^1 (2x^2 + x + 1) dx$ in C language, where the number of intervals is

6, using Weddle's rule.

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7. The area A of a circle of diameter d is given for the following values :

x	80	85	90	95	100
f(x)	5026	5674	6362	7088	7854

Write a C program to calculate the value for the area of circle of diameter 82 using Newton's Fourword interpolation.

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8. Write a program in C to compute the root of the equation $f(x) = \frac{\cos x + 2}{3} = 0$ using Fixed-point iteration method.

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9. Write a C program to solve the system of equations using Gauss-Seidal rule

$$8.467x_1 + 5.137x_2 + 3.141x_3 + 2.063x_4 = 29.912$$

$$5.137x_1 + 6.421x_2 + 2.617x_3 + 2.003x_4 = 25.058$$

$$3.141x_1 + 2.617x_2 + 4.128x_3 + 1.628x_4 = 16.557$$

$$2.063x_1 + 2.003x_2 + 1.628x_3 + 3.446x_4 = 12.690$$

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10. Write a program in C to compute $f(0.3)$ from the following table using Newton's Divided difference formula

x	0	1	3	4	7
f(x)	1	3	49	129	813

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11. Write a C program to find $\int_0^1 \frac{dx}{x^2 + 6x + 10}$, with 4 intervals using Trapezoidal rule. 35

12. Write a program in C to solve the following system of equations using Gauss-Jordan method,

$$3x_1 + 18x_2 + 9x_3 = 18$$

$$2x_1 + 3x_2 + 3x_3 = 117$$

$$4x_1 + x_2 + 2x_3 = 283$$

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13. Write a C program to find the root of the equation $e^x - 3x = 0$ using Newton-Raphson's method. 35

14. Write a C program to find $\int_1^3 \frac{dx}{5+3x}$ with 8 intervals using Simpson's $\frac{1}{3}$ rule. 35

15.

x	4	7	9	12
f(x)	-43	83	327	1053

Write a C program to find f(10) from the above table using Newton's Divided difference formula. 35

16. Write a C program to find the root of the equation $x^3 - 4x - 9 = 0$ using Bisection method. 35

17. Write a C program to find the root of the equation $\cos x - xe^x = 0$ using Regula-Falsi method. 35

18. Write a C program to evaluate $\int_0^1 \frac{dx}{1+x^2}$ with n = 6 using Weddle's rule. 35

19. Write a C program to find the root of the equation $x + \log x - 2 = 0$ using Iteration method.

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20. Write a C program to solve the following system of equations using Gauss-Jordan method :

$$8x_1 - 3x_2 - 2x_3 = 20$$

$$4x_1 + 11x_2 - x_3 = 33$$

$$6x_1 + 3x_2 + 12x_3 = 36$$

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21. Write a C program to find the root of the equation $x^3 - 9x + 1 = 0$ using Regula-Falsi method.

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22. Write a C program in C to evaluate $\int_0^1 (4x - 3x^2) dx$ with $n = 10$ using Trapezoidal rule.

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[Viva-Voce : 20 Marks

Practical Note Book : 10 Marks]