

S.No. 470

MCA 2304

No. of Printed Pages : 05

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 21204	Roll No.																		
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MCA Examination 2018-19

(Third Semester)

COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

Time : Three Hours

[Maximum Marks : 60

Note :- Attempt all questions.

SECTION - A

1. Attempt all parts of the following : $8 \times 1 = 8$
- Describe various types of errors.
 - Write the order of convergence of false position method.
 - Define pivoting.
 - Define forward difference table.
 - What is Interpolation?

[P. T. O.]

- (f) Write backward difference formula for interpolation.
- (g) Define bar chart with example.
- (h) Write Euler formula for solution to ordinary differential equation.

SECTION - B

2. Attempt any two parts of the following : $2 \times 6 = 12$
- (a) Use bisection method to find a root of $x^2 - 4 = 0$.
 - (b) Write algorithm to find solution of linear equations by Gauss elimination method.
 - (c) Use Simpson's 3/8 rule to estimate

$$\int_1^3 (x^2 + x) dx \quad h = \frac{1}{3}$$

- (d) Obtain the solution by Jacobi iteration method :

$$2x + y + z = 5$$

$$3x + 5y + 2z = 15$$

$$2x + y + 4z = 8$$

SECTION - C

Note :- Attempt all questions. Attempt any two part from each questions. $5 \times 8 = 40$

3. (a) Apply Lagranges formula to find $f(2.7)$, given :

x	1	2	3	4
f(x)	2.5	4	7	10

- (b) Solve by Taylor series method and evaluate $y(1.10)$ for

$$\frac{dy}{dx} = x^2 + y^2; y(1) = 2; h = 0.5$$

- (c) The velocity V and distance S is tabulated below :

S (m)	0	2.5	5	7.5	10
V (m/s)	16	19	21	22	20

Estimate time taken to traverse 10 meters by Simpson's $\frac{1}{3}$ rule.

4. (a) Given

$$x = 0.5555 E1$$

$$y = 0.4545 E1$$

$$z = 0.4533 E1$$

Verify if $x(y - z) = xy - xz$.

[P. T. O.]

- (b) Write 03 consequences of normalised floating point arithmetic.
- (c) Estimate $\sin \theta = 25^\circ$ using Newton Gregory forward difference formula for the data :

θ	10	20	30	40
$\sin \theta$	0.1736	0.3420	0.5000	0.6428

5. (a) Use Picard method to solve for $y(0.1)$ given :

$$\frac{dy}{dx} = x^2 + y^2; y(0) = 0$$

- (b) Given calculated value of $x = 52.35$ with relative error atmost 4%. Find the range of value within which exact value will lie.
- (c) Describe following :
- (i) Least square method
 - (ii) Statistical quality control methods
6. (a) Obtain a root of 36 by Newton Raphson algorithm.

- (b) Describe Stirling's and Bessel's formula with a suitable example.
- (c) Solve by Gauss Seidel algorithm :

$$2x - 7y - 10z = -17$$

$$5x + y + 3z = 14$$

$$x + 10y + 9z = 7$$

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