s.N. 470

MCA 2304

No. of Printed Pages: 05

Following Paper ID and Ro	II No. 1	o b	e fille	d in	you	rĄ۱	nsw	er F	300	k.
PAPER ID: 21204	Roll No.									

## MCA Examination 2018-19

(Third Semester)

# COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

Time: Three Hours]

[Maximum Marks: 60

Note: Attempt all questions.

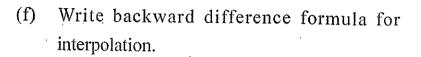
### SECTION-A

1. Attempt all parts of the following:

 $8 \times 1 = 8$ 

- (a) Describe various types of errors.
- (b) Write the order of convergence of false position method.
- (c) Define pivoting.
- (d) Define forward difference table.
- (e) What is Interpolation?

[P. T. O.



- (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

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

(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 travere 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.

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

θ	10 .	20	30	40
sin θ	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:

$$2 x - 7 y - 10 z = -17$$
  
 $5 x + y + 3 z = 14$   
 $x + 10 y + 9 z = 7$ 

RHH

