

10. Define ANOVA and state the assumptions made in it.

**Section B**

**Note :** Attempt all the questions.

11. (a) Find  $\sqrt{32}$  by Newton-Raphson method.  
(b) Define order of convergence and obtain it for Regula-Falsi method.

*Or*

Find a pair of complex roots of  $x^4 - 5x^3 + 20x^2 - 40x + 60 = 0$  by Baerestow method taking initial approximation as  $(-4, 8)$ .

**12**

12. Using Milne's predictor corrector method, solve :

$$\frac{dy}{dx} = x - y^2 \quad y(0) = 0$$

for  $y(0.8)$ . Compute the required value by method of your choice.

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**Roll No. ....**

**Exam Code : J-19**

**Subject Code—0417**

**M.C.A. (Third Year) EXAMINATION**

(Batch 2009 Onwards)

(5 Years Integrated Course)

**MATHEMATICS-III**

**MCA-305**

(Computer Oriented Numerical and Statistical Methods Using C)

*Time : 3 Hours*

*Maximum Marks : 70*

**Section A**

**Note :** Attempt any *Seven* questions. **7×5=35**

1. Find the no. of terms in

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots \text{ s.t. their sum gives}$$

the value correct upto 5 decimal places for all  $x$ .  $0 < x < 1$ .

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**P.T.O.**

2. Find the root  $x^4 - x - 10 = 0$  using Newton-Raphson method. Correct upto three decimal places.

3. Solve the initial value problem for  $y(0.1)$  :

$$\frac{dy}{dx} = x^2 + y^2, y(0) = 1$$

by Taylor's series.

4. Estimate  $f(42)$  for the data :

$x$	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

5. Find  $y'(5)$  for the data :

$x$	0	1	2	3	4	5	6
$y$	0	2.5	8.5	15.5	24.5	36.5	50

6. Evaluate :

$$\int_0^1 \frac{dx}{1+x}$$

using 7 ordinates by Simpson's  $\frac{3}{8}$  rule.

7. Solve by Gauss Elimination method :

$$x_1 + x_2 + 6x_3 + x_4 = -5$$

$$x_1 + x_2 + x_3 + 4x_4 = -6$$

$$5x_1 + x_2 + x_3 + x_4 = 4$$

$$x_1 + 7x_2 + x_3 + x_4 = 12$$

8. A drug is given to 10 patients and increment in the blood pressure were recorded 3, 6, -2, 4, -3, 4, 6, 0, 0, 2. Is it reasonable that drug has no effect on change of blood pressure ? (5% value of  $t$  for 9 d.f. = 2.26)

9. A set of 5 coins is tossed 3200 times and the no. of heads appearing each time is noted. The results are :

No. of heads	0	1	2	3	4	5
Frequency	80	570	1100	900	500	50

Test the hypothesis that coins are unbiased. (5% value of  $\chi^2$  for 5 is 11.07)

*Or*

(a) Evaluate :

$$\int_{-1}^1 (5x^3 - 3x^2 + 2x + 1) dx$$

by Gauss quadrature three point formula-

(b) Fit a second degree polynomial to the data : **12**

$x$	:	0	1	2	3	4
$f(x)$	:	-4	-1	4	11	20

**13.** Explain the various methods used for determining the trend, giving their merits and demerits.

*Or*

Make an analysis of variance to assess the variation in performance of students of 4 Convent schools taken at random :

<b>Schools</b>			
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

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**5**

**260**

*Or*

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**5**

**260**