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.

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 $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\ldots$ s.t. their sum gives the value correct upto 5 decimal places for all x. $0 < x < 1$.

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 χ^2 for 5 is 11.07)

Or

(a) Evaluate :

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

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 :

Schools

A	**B**	**C**	**D**
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

Or

(a) Evaluate :

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

by Gauss quadrature three point formula-

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

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