**MCA/D08**

**Computer Oriented Numerical and Statistical Methods**

**MCA -105**

**Time : 3 Hours** **MM:50**

**Note:- Question no 1 is compulsory. In addition to compulsory question Attempt Four more questions by selecting One Question from each unit.**

**1(i)** **Illustrate normalized floating point numbers through examples.**

**(ii)** **Multiply +5543E12*.4111E-15**

**(iii)** **What basic questions are relevant to iterative methods?**

**(iv)** **List the possible errors that can occur in arithmetic operations of numbers.**

**(v)** **Write about pitfalls in computing**

**(vi)** **Define ill conditioned equations.**

**(vii)** **Write the purpose of course fitting techniques.**

**(viii)** **Distinguish between closed from integration and numerical integration.**

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## UNIT-I

**2(a)** **Find he value of $(1+x)^2$ and $(x^2+2x)+1$**
**When x = 05999E-2. Calculate the relative errors in the two methods of calculating the expression.** **7**

**(b)** **Subtract .4545E5 from 05433E7. Will there be any possibility of round off error? If yes, quantity the error.** **7**

**3(a)** **Find the roots of the equation $x^3 – 4x +1 = o$ to 3 significant digits using Newton –Raphson method.** **7**

**(b)** **Solve the equation $e^{-x} – x =0$ by Bisection method.** **7**

## UNIT-II

**4** **Solve the following set of equations by Gauss-Seidel iterative method:**

$$x_1 + x_2 + x_3 = 3$$
$$2x_1 + 3x_2 + x_3 = 6$$
$$x_1 - x_2 - x_3 = -3$$

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**5(a)** **Solve the differential equation**
**$dy/dx + xy = 0$, $y(0) = 1$**
**from x=0 to x=0.25 using Euler's method.** **7**

**(b)** **Solve the following second order differential equation by second order Runga-Kutta Method**

$$d^{2y} / dx^2 + 5dy + 4y = 5$$

**$y=(0) = y^1 (0) =0$. Find solution in the range $2>=x>=0$ 7**

## UNIT-III

**6(a) The population of a city in a census taken once in ten years is given below. Estimate the population in the years1925, 1975 and 1984 using different table.**

| Year | 1921 | 1931 | 1941 | 1951 | 1961 | 1971 | 1981 |
|---|---|---|---|---|---|---|---|
| Population in Thousands | 35 | 42 | 58 | 84 | 120 | 165 | 220 |

**(b) Fit a straight line for the following table of values:**

| Independent | 1 | 2 | 4 | 5 | 6 | 8 | 9 |
|---|---|---|---|---|---|---|---|
| Dependent Variabley | 2 | 5 | 7 | 10 | 12 | 15 | 19 |

**7 Write the Taylor series representation ofa given function f(x) giving significance of various terms. Use this representation for deriving Taylor series expression for f(x) =cos x about $x_0=0$ 14**

## UNIT-IV

**8(a) A random sample of 10 boys has the following IQs:**
**70,130,112,110,88,85,98,99,107,100.**
**Is the assumption of a population mean I.Q. of 100 suitable regarding above Data? Find a reasonable range in which most of the mean I.Q. values of sample of 10 boys lie. 7**

**(b) A correlation of 0.72 is obtained from a sample of30 pairs of observations. Can the sample be regard ed as drawn from a bivariate normal population in which true correlation coefficient is 0.8? 7**

**9 Write short notes on the following:**
- **(a) Chi-square test**
- **(b) One-way classification**
- **(c) Time-series Analysis**
- **(d) Measurement of Trend 14**