**Printed Pages : 2**

**CA201**

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

**PAPER ID : 214201**

**Roll No.** | | | | | | | | | | |

# MCA

## (SEM. II) THEORY EXAMINATION, 2014-15

### COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUE

Time : **3** Hours] [Total Marks : **100**

**Note:** *Attempt All Questions. All Question carry equal marks.*

**Q.1 Attempt any FOUR question.** **(5×4=20)**

a. Explain in brief how floating point numbers are stored in computers. What are the factors that affect their accuracy and range?
b. Explain with the help of suitable example, show that associative law of addition may not valid in numerical computation.
c. With the help of example explain how numerical solutions differ from analytical solution.
d. What are the different type of error that may arise in numerical computations
e. Differentiate between accuracy and precision?
f. Use Muller's method to find a root of the following equation:

$$x^3 - x - 1 = 0$$

**Q.2 Attempt any TWO question.** **(5×4=20)**

a. What do you understand by numerically unstable procedure? Explain with a suitable example.
b. Explain in details with example the differences between interpolation and curve fitting.
c. Define rate of convergence. Obtain rate of convergence of Newton's Raphson method.?

**Q.3 Attempt any TWO question.** **(10×2=20)**

a. Using Euler's method, solve the following differential equation.

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

b. Use the Runge-Kutta fourth order method to find the value of $y$ when $x = 1$ given that $y = 1$ when $x = 0$ and that $\frac{dy}{dx} = (y - x)/(y + x)$

c. Solve $\frac{dy}{dx} = x + y$, Given $y(1)=0$ find $y(1,1)$ by Taylor's method.

**Q.4 Attempt any TWO question.** **(10×2=20)**

a. Fit the curve $y = ax^b$ to the following data, using method of least squares.

| $x$: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $y$: | 2.98 | 4.26 | 5.21 | 6.1 | 6.8 | 7.5 |

b. For a bi-variate distribution n=18,
$\sum x^2 = 60, \sum y^2 = 96, \sum x = 12, \sum y = 18, \sum xy = 48$

Find the equations of lines of regressions.

c. Write short notes on :

1. Quality Control Methods
2. Multiple Regression Analysis

**Q.5 Attempt any TWO question.** **(10×2=20)**

a. Explain in details with example Chi-Square Test.

b. Write short notes on :

1. One-way classification
2. ANOVA Table

c. Explain the significance of T and F-Test.