NEW

2015

BCA

3rd Semester Examination

COMPUTER ORIENTED NUMERICAL METHOD AND STATISTICAL METHOD

PAPER—2103

Full Marks : 70

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer *Question no. 1* and any *four* from the rest.

1. Answer any *five* questions : 5×2

(i) Show that $\Delta . \nabla \equiv \Delta - \nabla$

(ii) What you mean by transcendental equation ?

(iii) Give geometrical significance of Simpson's $\frac{1}{3}$ rule.

(iv) What are the advantage and disadvantage of regula falsi method ?

(v) Two coins are tossed. Find its probability distribution of the number of heads.

(vi) What are the sufficient conditions for the convergence of the method of iteration ?

(vii) What is statistical inference ?

(viii) When may the bisection method be used to find a root of the equation $f(x) = 0$?

2. (a) Write standard normal density and distribution function of single variable. 7

(b) Evaluate f (0·33) using the following table :

x	0·3	0·4	0·5	0·6	0·7
f(x)	0·6179	0·6554	0·6915	0·7257	0·7580

8

3. (a) Develop Trapezoidal rule of integration of a function from Newton's Forward interpolations method. 7

(b) Solve the following equations :

$5x + 3y + z = 2$

$4x + 10y + 4z = -4$

$2x + 3y + 5z = 11$

By Gauss - elimination method. 8

4. (a) Evaluate the integral $\int_0^2 \left(2x^3 + 3x^2\right) dx$, using the Simpson's $\frac{1}{3}$ rule on taking $h = 0{\cdot}5$. 8

(b) Explain the Regula-Falsi method to determine approximately one simple root of an equation $f(x) = 0$. Give its geometrical interpretation. 7

5. (a) Find a real root of the equation $f(x) = x^3+x^2+x+7=0$ correct to three significant figure by bisection method.

(b) Evaluate $\int_0^5 \frac{dx}{1+x}$ by taking $h = 1$, using trapezoidal rule. 8+7

6. (a) Solve by iterative method :

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

$$x_1 - 8x_2 + 3x_3 = -4$$

$$2x_1 + x_2 + 9x_3 = 12$$

(b) Solve by Euller method, the following differential equation for $x = 1$ by taking $h = 0{\cdot}2$.

$$\frac{dy}{dx} = x + y, \; y = 1 \text{ when } x = 0$$

Calculate upto four significant figures. 8+7

7. (a) Establish Newton-Raphson Method.

(b) Find the value of the constant K such that

$$f(x) = Kx(1-x), \quad 0 < x < 1$$

$$= 0 \qquad \text{elsewhere.}$$

is a probability density function. Construct the distribution function and compute $P\left(x > \frac{1}{2}\right)$.

7+8
