2018

BCA 3rd Semester Examination

COMPUTER ORIENTED NUMERICAL METHOD

&

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 Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions : 5×2

(a) What you mean by absolute error ?

(b) What are the objectives of interpolation ?

(c) Write the condition of convergence of iteration process for solving the root of an equation.

(d) Round-off the number 4.5126 to four significant figures and find the relative percentage error.

(e) Prove that $(1 + \Delta)(1 - \nabla) = 1$.

(f) What do you mean by probability density function of a random variable ?

(g) What is the probability of an odd sum when two dice are thrown ?

(h) A card is drawn from a pack. What is the probability that it is queen of spades ?

2. (a) Write the general rule for rounding off a number to n significant digits.

(b) Evaluate f(1.2)

x	0	1	2	3	4
f(x)	1	1.5	2.2	3.1	4.3

(c) Write the geometrical interpretation of Simpson's one-third formula. 5+5+5

3. (a) Establish Newton-Raphson Method for solving the real root of an equation.

(b) Write the density and distribution function of the standard normal distribution. 9+6

4. (a) Solve by the method of iteration :

$$20x + 5y - 2z = 14$$

$$3x + 10y + z = 17$$

$$x - 4y + 10z = 23$$

(b) Establish the Sufficient condition of convergence of the Newton-Raphson method. 9+6

5. (a) Establish Simpson's one-third rule of integration from Newton's forward difference formula.

(b) Find a real root of the equation $f(x) = x^3 + x^2 + x + 7 = 0$ by bisection method. 9+6

6. (a) Show that a function f(x) given by

$$f(x) = x \qquad 0 < x < 1$$

$$= k - x \qquad 1 < x < 2$$

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

is a probability density function for a suitable value of the constant k. Calculate the probability that the random variable lies between $\frac{1}{2}$ and $\frac{3}{2}$.

(b) Evaluate the integral $\int_0^1 \sin x^2 dx$ by Trapezoidal rule taking 10 sub-intervals. 9+6

7. (a) Evaluate y(0.04) given $\frac{dy}{dx} + y = 0$, $y(0) = 1$ by Euler method.

(b) Given the following table :

x	0	5	10	15	20
f(x)	1.0	1.6	3.8	8.2	15.4

Compute f(21) by Newton's backward formula. 9+6