BCA 3rd Semester Examination, 2019

COMPUTER ORIENTED NUMERICAL METHOD AND STATISTICAL METHOD

PAPER – 2103

Full Marks : 70

Time : 3 hours

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

The figures in the right hand margin indicate marks

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

Illustrate the answers wherever necessary

1. Answer any *five* questions : 2 × 5

(*a*) What do you mean by computational error ?

(*b*) If we take $\pi = 3{\cdot}14$ instead of $\frac{22}{7}$, find the absolute error, relative error and relative percentage error.

(*c*) Write the sufficient condition of convergence to solve the system of linear equations by the method of iteration.

(*d*) Briefly explain the concept of polynomial interpolation.

(*e*) If

$$P(A \cup B) = \frac{17}{30}, P(B) = \frac{2}{5} \text{ and } P(A \cap B) = \frac{1}{6}$$

find $P(A)$.

(*f*) What is the advantage of regula-falsi method ?

(*g*) When Binomial distribution is approximated to Poisson distribution ?

(*h*) What do you mean by random variable ?

2. (*a*) Using Lagrange's formula, find the interpolation polynomial corresponds to the following data : 7

x	-1	0	2	5
$f(x)$	9	5	3	15

(*Continued*)

(*b*) Explain Euler's method of solving differential equation of first order and first degree. State the limitations of this method. 5 + 3

3. (*a*) Solve by Gauss-Seidel iteration method :

$$8x_1 + 2x_2 - 2x_3 = 8$$
$$x_1 - 8x_2 + 3x_3 = -4$$
$$2x_1 + x_2 + 9x_3 = 12$$

Give answer correct upto two significant figures. 9

(*b*) Write the advantage and disadvantage of Lagrangian Interpolation formula. 6

4. (*a*) Calculate the positive root of the equation $x^2 + 2x - 2 = 0$. Correct upto two significant figures by the Newton-Raphson method. 8

(*b*) Explain Bisection method for algebric equation using an example. 7

5. (*a*) Using Newton's forward interpolation formula, find $f(1{\cdot}02)$ having given : 6

x	1·00	1·10	1·20	1·30
$f(x)$	0·8415	0·8912	0·9320	0·9636

(*b*) Write short note on normal distribution. 5

(*c*) Write the classical definition of probability of any event *A*. A coin is tossed 3 times in succession. Find the probability of 2 heads. 2 + 2

6. (*a*) Define following events and give example for each

(*i*) Certain Event

(*ii*) Mutually exclusive events

(*iii*) Complementary events. 2 + 2 + 2

(*b*) Establish the relation between Forward and Backward difference. 6

(*c*) Write the geometrical interpretation of Simpson's $\frac{1}{3}$ formula. 3

7. (*a*) Evaluate

$$\int_0^{\frac{\pi}{2}} \sin x \, dx$$

by Trapezoidal rule and compare the result with the exact value. 7

(*b*) Establish Newton's forward difference Interpolation formula. 8
