

Total Pages – 4

B.Sc. RNLKWC-/DSE2T/22

2022

BCA (Hons)

B.Sc. Fifth Semester End Examination - 2022

PAPER - DSE2T

Full Marks : 40

Time : 2 hours

*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.*

Group-A

Answer any five questions

5×2=10

1. a) What is the sufficient condition for the convergence of the Gauss-seidal iterative method?
- b) What is Round-off error?

(Turn Over)

(2)

- c) What is the difference between Trapezoidal rule and Simpson's 1/3rd rule?
- d) State the limitation of using Newton-Raphson method.
- e) Round-off the following number to four significant figures.
3.3465827, 15.235387, 5.37582, 0.00457328
- f) Prove that, $\nabla \equiv I - E^{-1}$.
- g) Given that $\frac{dy}{dx} = -2y$, $y(0) = 1$. Find $y(0.2)$ by Euler's method. (Take $h = 0.2$, perform one iteration)
- h) Obtain second order divided difference of $f(x) = \frac{1}{x}$ based on points x_0, x_1, x_2 .

Group - B

2. Establish Simpson's 1/3rd formula from Newton's formula.
3. Find a positive root of $x^2 + 2x - 2 = 0$ using Bisection method correct to two significant figures.

B.Sc. RNLKWC-/BCA/DSE2T/22

(Continued)

(3)

4. Solve, by Gauss-elimination method, the system
 $x + 3y + 2z = 5$
 $2x - y + z = -1$
 $x + 2y + 3z = 2$

5. Compute $f(0.5)$ from the following table

x	0	1	2	3
f(x)	1	2	11	34

6. Prove that the nth forward difference of a polynomial of degree n in x is constant when the values of independent variable are at equal intervals. 5
7. Find the number of students who obtained less than 45 marks from the following data.

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

B.Sc. RNLKWC-/BCA/DSE2T/22

(Turn Over)

(4)

Group - C

Answer any one question :

8. a) Solve the following system by Gauss-seidal iterative method

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

$$x_1 + 2x_2 + 3x_3 = 11$$

$$2x_1 - 5x_2 + x_3 = -6$$

- b) Evaluate $\int_0^1 (4x - 3x^2) dx$ by taking $n=10$ using trapezoidal formula.

9. By using Runge-kutta second order formula, find $y(0.1)$, and $y(0.2)$ correct upto four decimal places for the differential equation.

$$\frac{dy}{dx} = y - x, y(0) = 2, \text{ Take } h = 0.1$$

10