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B.Sc. RNLKWC-/DSE-3T/22

2022

COMPUTER SCIENCE

B.Sc. Sixth Semester End Examination - 2022

Paper - DSE-3T

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.*

1. Answer five questions. 2×5=10
- a) Approximate the numbers and find the sum  
245.72, 258.8, 17.5, 0.0087, 0.00031, 41.5
- b) Prove that  $\Delta \cdot \nabla = \Delta - \nabla$
- c) What are the disadvantages of the Newton-Raphson  
method. 2

*(Turn Over)*

( 2 )

- d) Define “Degree of Precision” of a Numerical integration formula. 2
- e) Why is the Regula falsi method calls a method of linear interpolation? 2
- f) For solving a system of linear equations, which method (direct or iterative) is better and why? 2
- g) How do you interpret the statement Euler’s method is a first order Runge-kutta method? 2
- h) Define diagonal dominant matrix. 2

2. Answer any four questions. 4×5=20

- a) Explain the method of fixed point iteration with the condition of convergence for numerical solution of the equation  $f(x)=0$  5
- b) Establish a polynomial interpolation formula (without the error) for equally spaced arguments to be used for a point near the beginning of the table.
- c) use Gauss – elimination method to solve the following system : 5
- $$\begin{aligned}x+3y+2z&=5 \\2x-y+z&=-1 \\x+2y+3z&=2\end{aligned}$$
- correct up to two significant figures.

( 3 )

- d) Deduce Trapezoidal rule (without error) in composite form by integrating Newton’s forward interpolation formula. Write down the degree of precision of the above rule.

3. Answer one question. 10×1=10

- a) (i) Explain Euler’s method for solving first order differential equation of the form  $\frac{dy}{dx} = f(x,y)$

- (ii) Evaluate  $\int_0^1 \frac{xdx}{1+x^2}$  using Simpson’s  $\frac{1}{3}$  rule correct upto 2 decimal places.

- b) (i) Complete the following table :-

x :	10	15	20	25	30	35
f(x) :	19.97	21.51	–	23.52	24.65	–

- (ii) What is the rate of convergence? Newton–Raphson method is said to have a quadratic convergence– Explain.