K20U 0947

Reg. No. : ....

Name : ....

IV Semester B.C.A. Degree (CBCSS-Reg./Sup./Imp.) Examination, April 2020
(2014 Admn. Onwards)
General Course
4A14BCA : NUMERICAL ANALYSIS

Time : 3 Hours

Max. Marks : 40

SECTION – A

1. **One**-word answer.

(8×0.5=4)

a) A graph containing only isolated nodes is called a _____ graph.

b) "If p then q" is called a _____ statement.

c) The Newton-Raphson method of finding roots of nonlinear equations falls under the category of _____ methods.

d) The connective NAND is denoted by

e) The first forward difference is given by

f) A product of the variable and their negations in a formula is called an _____ product.

g) The number of edges appearing in the sequence of a path is called the _____ of the path.

h) The linear interpolation formula is given by

SECTION – B

Write short notes on **any seven** of the following questions.

(7×2=14)

2. Define converse, inverse and contrapositive of any statement formula $p \rightarrow q$.

3. What do you mean by adjacency matrix of a graph G ?

4. Explain disjunctive normal forms is mathematical logic.

5. Write down two different approaches for solving systems of linear algebraic equations.

6. Define a simple graph. Give an example.

7. Find the Newton-Raphson method formula for finding the square root of a real number R from the equation $x^2 - R = 0$.

P.T.O.

8. Expand a function y(x) about a point $x = x_0$ using Taylor's theorem of expansion.

9. The relative error is defined as $e_r =$

10. Define a directed tree.

11. The table below gives square roots for integers.

x	1	2	3	4	5
f(x)	1	1.414	1.7321	2	2.2361

Determine the square root of 2.5 using linear interpolation formula.

SECTION – C

Answer **any four** of the following questions. (4×3=12)

12. Show that $p \rightarrow (q \rightarrow p) \equiv \sim p \rightarrow (p \rightarrow q)$.

13. Compute the integral $I = \int_{-2}^{2} e^{\frac{-x}{2}}$ using Gaussian two point formula.

14. Construct the truth table of conditional and biconditional statements.

15. Solve the following system of equations by the process of elimination.
$3x + 2y + z = 10$
$2x + 3y + 2z = 14$
$x + 2y + 3z = 14$

16. Define accuracy and precision of a number.

17. Derive Lagrange interpolation polynomial.

SECTION – D

Write an essay on **any two** of the following questions. (2×5=10)

18. Obtain the principal disjunctive normal form of $(p \wedge q) \vee (\sim p \wedge r) \vee (q \wedge r)$.

19. Solve the differential equation $\frac{dy}{dx} + xy = 0$, $y(0) = 1$ from $x = 0$ to $x = 0.25$ using Euler's method.

20. Determine the root of the given equation $x^2 - 3 = 0$ for $x \in [1, 2]$ using bisection method.

21. Find the root of the equation $f(x) = x^2 - 3x + 2$ in the vicinity of $x = 0$ using Newton-Raphson method.