K16U 0495

Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CCSS – Supple./Imp.) Examination, May 2016
GENERAL COURSE IN COMPUTER SCIENCE
4A12 CSC : Numerical Skills
(2013 and Earlier Admissions)

Time : 3 Hours

Max. Weightage : 21

SECTION – A

Answer **all** questions. Weightage for a bunch of **4** questions is **1**.

1. The number of decimal positions in a number is referred to as _____

2. $(723)_8 = ($_____$)_2$.

3. When a fixed number of digits are used to represent exact numbers _____ occur.

4. $0.4231\ E5 + 0.5433\ E5 = $_____

W. 1

5. The conditional statement $P \rightarrow Q$ is false when _____

6. The basis of the rule of inference modus ponens is the tautology _____

7. A node in a graph $G = (V, E)$ which is not adjacent to any other node is called ____

8. A path in a digraph in which the edges are all distinct is called a _____

W. 1

SECTION – B

Answer **any 5** questions, **each** carries weightage 1.

9. What are the different types of errors encountered in performing numerical calculations ? Explain briefly.

10. Solve $x + 2y = 3$ by Gauss Jordan method.
    $3x - 2y = 1$

11. Find the location of the negative real root of $x^3 - 3x + 4 = 0$.

12. Evaluate $\int_{-1}^{1} \frac{1}{x+3} dx$ by Gaussian quadrature formula.

13. Construct the truth table for $(P \wedge Q) \vee \neg Q$.

14. Obtain the conjunctive normal form of $\neg(P \vee Q) \rightarrow (P \wedge Q)$.

15. Define a binary tree. Give an example.

16. Define compliment of a graph. Find the compliment of the following graph.   (5×1=5)
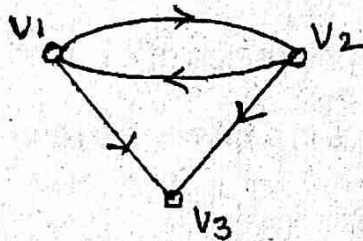
SECTION – C

Answer **any 5** questions, **each** carries weightage 2.

17. Explain bisection method and use it to find a root of the equation $x^3 - 5 = 0$.

18. Find $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at x = 1 where the function y = f(x) is given by the following table.

x	0	0.2	0.4	0.6	0.8	1
y	0	0.12	0.48	1.1	2	3.2

19. Evaluate $\int_{0}^{1} \frac{1}{1+x} dx$ using Simpson's $\frac{1}{3}^{rd}$ rule taking 10 subintervals.

20. Compute y(0.1) and y(0.2) correct to 4 decimal places by Taylor series method given $y' = 1 + xy$, y(0) = 1.
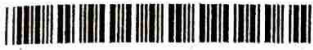
21. Construct the truth table for $[(P \to Q) \wedge (Q \to R)] \to (P \to R)$ and show that it is a tautology.

22. Prove that in a simple digraph, every node of the digraph lies in exactly one strong component.

23. Obtain the adjacency matrix and path matrix of the following digraph.
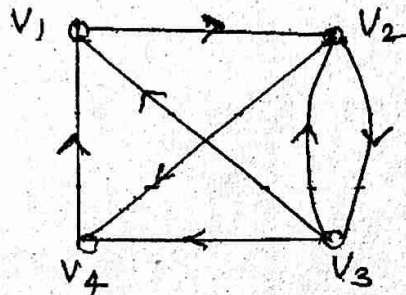
24. Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises

    $P \vee Q, Q \to R, P \to M$ and $\neg M$. (5×2=10)

SECTION – D

Answer **any 1** question. Weightage 4.

25. Solve the system

    $10x + 2y + z = 9$

    $x + 10y - z = -22$

    $-2x + 3y + 10z = 22$ by

    a) Jacobi's method

    b) Gauss-Seidel iteration method. Which method is more efficient ? Justify.

26. Find the roots of $6x^2 - 17x + 5 = 0$ correct to 2 decimal places by

    a) Regula-falsi method

    b) Newton Raphson method. (1×4=4)