M 8543

Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CCSS-Reg./Supple./Imp.) Examination, May 2015
GENERAL COURSE IN COMPUTER SCIENCE
4A12CSC : Numerical Skills

Time : 3 Hours Max. Weightage : 21

SECTION – A

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

1. The number 61.38 is accurate to __________ significant digits.
2. The octal representation of the binary number 111010.101 is __________
3. A numerical method is said to be __________ if it produces an exact solution within the given limits.
4. 0.324E4 + 0.561E5 = __________
5. Statements which do not contain any connectives is called as __________ statements.
6. The disjunction of 2 statements P and Q is False if __________
7. A path in a digraph in which all the nodes through which it traverses are distinct is called an __________ path.
8. A graph which contains some parallel edges is called a __________

(2×1=2 Weightage)

SECTION – B

Answer **any 5** questions. **Each** carries weightage **1**.

9. Find an approximate root of $x^3 - 4x + 1 = 0$ by Bisection method. Do 3 iterations.
10. Solve $2x + y = 1$ by Gauss Jordan method.

    $x - 5y = -5$
11. What is meant by numerical differentiation ?

P.T.O.

12. Evaluate $\int_{-1}^{1} x^4 dx$ by Gauss-Legendre 2 point quadrature formula.

13. Construct the truth table for the statement $\neg P \vee Q$.

14. Obtain the disjunctive normal form of $P \wedge (P \to Q)$.

15. Define the concept of isomorphism in graphs. Give examples of 2 isomorphic graphs.

16. Define a simple graph. Give an example. **(5×1=5 Weightage)**

SECTION – C

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

17. Explain Newton-Raphson method.

18. Solve by Gauss-Seidal iteration method

$$2x + y + z = 5$$
$$3x + 5y + 2z = 15$$
$$2x + y + 4z = 8$$

19. Find $\frac{dy}{dx}$ at $x = 0.96$ and at $x = 1.04$ for the function $y = f(x)$ given in the following table.

x	0.96	0.98	1	1.02	1.04
y	0.7825	0.7739	0.7651	0.7563	0.7473

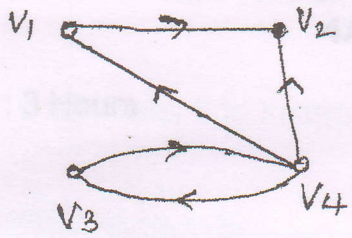
20. Evaluate $\int_{1}^{3} \frac{dx}{2x-1}$ by Simpson's $\frac{1}{3}^{rd}$ rule taking 8 subintervals.

21. Use Euler's method to find y(0.1) correct to 4 decimal places taking h = 0.02 given $y' = \frac{y-x}{y+x}$, $y(0) = 1$.

22. Show that for any 2 statements P and Q $\neg(P \wedge Q)$ follows from $\neg P \wedge \neg Q$.

23. Show that $\neg\left(P \rightleftarrows Q\right) \Leftrightarrow (P \wedge \neg Q) \vee (\neg P \wedge Q)$.

24. Obtain the adjacency matrix and path matrix of the following digraph.



(5×2=10 Weightage)

SECTION – D

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

25. a) Evaluate $\sqrt[7]{125}$ correct to 3 decimal places by Regula-Falsi method.

b) Use fourth order Runge-Kutta method to find $y(0.1)$ given $y' = x + y$, $y(0) = 1$ (Take $h = 0.0.5$).

26. a) Obtain the principal conjunctive normal form of $(\neg P \rightarrow R) \wedge \left(Q \rightleftarrows P\right)$

b) Prove that the statement

$[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$ is a tautology. **(1×4=4 Weightage)**