K17U 0678

Reg. No. : ....

Name : ....

IV Semester B.C.A. Degree (CBCSS – Reg./Sup./Imp.)
Examination, May 2017
GENERAL COURSE
4A14BCA : Numerical Analysis
(2014 Admn. Onwards)

Time : 3 Hours   Max. Marks : 40

SECTION – A

1. Answer **all** questions. **Each** question carries ½ mark.   (8×½=4)

   a) Data that are obtained through measurement are called _____

   b) A statement which does not contain any of the connectives is
      called _____

   c) If P and Q are any two statements, then the statement $P \rightarrow Q$ is called _____

   d) In normalized floating point mode, the real number is expressed
      as _____

   e) An equation of the type $y = f(x)$ is said to be algebraic if it can be expressed
      in the form _____

   f) Law of implication states that $(P \rightarrow Q) \Leftrightarrow$ _____

   g) A graph containing only isolated node is called _____

   h) Any pair of nodes which are connected by an edge in a graph is called _____

SECTION – B

Write short notes on **any seven** of the following :   (7×2=14)

2. Calculate the value of $\dfrac{(x^2 - y^2)}{(x + y)}$ with x = 0.4845 and y = 0.4800 using normalized floating point arithmetic.

3. Determine the two smallest root of the equation
   f(x) = x sin x + cos x = 0 using bisection method.

4. Construct the truth table for $(P \to Q) \wedge (Q \to P)$.

5. What are principal disjunctive normal forms ? Give examples.

6. Explain Runge-Kutta method.

7. Explain the Triangulization method to solve the system of linear equations.

8. Use Simpson's rule to evaluate the integral $I = \int_0^1 \sqrt{(1 - x^2)}\, dx$ continually having the interval h for better accuracy.

9. What is meant by tree traversal ? Give recursive definition of various traversals.

10. Fit a cubic spline to the following data

X	1	2	3
Y	– 8	–1	18

    And compute y(1.5) and y' (1).

11. Write notes on
    a) Conjunctive normal forms
    b) Principal conjunctive normal form.

SECTION – C

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

12. Explain the two common measures used to measure the accuracy of the results.

13. Solve the following set of equations by Gauss elimination.
    $x_1 + x_2 + x_3 = 3$, $2x_1 + 3x_2 + x_3 = 6$, $x_1 - x_2 - x_3 = -3$

14. Use Simpson's method with n = 4 to estimate $\int_0^1 \dfrac{dx}{1 + x^2}$.

15. For the following function values of $f(x) = \sin h(x)$, estimate the second derivatives of $f(x)$ at $x = 1.2, 1.3, 1.4$ using a suitable formula

X	1.1	1.2	1.3	1.4	1.5
Y	1.3356	1.5095	1.6983	1.9043	2.1293

16. What is Romberg integration ? How does it improve the accuracy of integration ?

17. Prove that in a simple digraph, the length of any elementary path is less than or equal to n – 1 where n is the number of nodes in the graph.

SECTION – D

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

18. What is theory of inference ? Explain various rules of inference with suitable examples.

19. Solve the following system of equation by Gauss-Jordan method.
$$x_1 + 2x_2 - 3x_3 = 4$$
$$2x_1 + 4x_2 - 6x_3 = 8$$
$$x_1 - 2x_2 + 5x_3 = 4$$

20. Using Taylors expansion, derive a formula for computing second derivative of a function.

21. Give a storage representation for the following lists :

(a, (b, (c, d)), e, f)

((x), y, A, z)   where A = (a, b, (c, d)).

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