Code : 211304

B.Tech 3rd Semester Exam., 2014

NUMERICAL METHODS AND COMPUTATIONAL TECHNIQUE

Time : 3 hours   *Full Marks* : 70

Instructions :

(i) All questions carry equal marks.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Fill in the blanks/Choose the correct answer of any *seven* of the following :

   (a) —— are used to convert the low-level programs into machine codes/language.

   (b) Multiplication and division operation can perform with pointer.
       (i) True
       (ii) False

   (c) What do you call a constructor that takes no arguments?
       (i) Copy constructor
       (ii) Parameterized constructor
       (iii) Default constructor
       (iv) Distructor

AK15—1300/86   (*Turn Over*)

(2)

   (d) Count in C++ is a/an
       (i) object
       (ii) class
       (iii) function
       (iv) header file

   (e) —— is represented by =

   (f) In Newton-Raphson method, the error at any stage is proportional to the —— of the error in the previous stage.

   (g) Error in Simpon's rule is of order ——.

   (h) Solutions of simultaneous non-linear equations can be obtained using
       (i) the method of iteration
       (ii) Newton-Raphson method
       (iii) None of the above

   (i) nth difference of a polynomial of degree *n* is
       (i) zero
       (ii) +ve
       (iii) −ve
       (iv) constant

AK15—1300/86   (*Continued*)

(3)

(j) In the case of bisection method, the order of convergence is

   (j) linear

   (ii) quadratic

   (iii) cubic

   (iv) 1·856

2. (a) What is flowchart? Discuss this with symbols and give one example.

   (b) Draw the block diagram of a computer and explain the working of translators.

3. (a) Write a program in C++/C to generate a series of Armstrong numbers from 100-500 (a number is Armstrong if sum of the cube of the digits is equal to the number).

   (b) Write a program in C++/C to convert a decimal number to binary number.

4. (a) Explain the concept of sorting. What is the difference between internal sorting and external sorting? Give the name of internal sorting techniques (five).

AK15—1300/86   (Turn Over)

(4)

(b) Discuss iterative control statements of C programing with syntax.

5. (a) Find the real root of the equation $f(x) = x^3 - x - 1 = 0$ by bisection method up to 5th approximation.

   (b) Find a real root of the equation $x^6 - x^4 - x^3 - 1$ using the method of false position up to four decimal places.

6. (a) Find the inverse of the matrix using Gauss elimination method

$$\begin{bmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{bmatrix}$$

   (b) Find the real root of the equation $\log x - \cos x = 0$ by Newton-Raphson method.

7. (a) Write an algorithm of Jacobi iteration method.

   (b) Discuss Gauss-Seidel method of iteration.

8. (c) Compute the value of $f(x)$ for $x = 2·5$ from the table

x	1	2	3	4
f(x)	1	8	27	64

using Lagrange's interpolation method.

AK15—1300/86   (Continued)

(5)

(b) Explain trapezoidal rule and error estimation in it.

9. (a) Discuss Euler's method.

(b) Explain Runge-Kutta method of 4th order.

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