04743

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) BTCLEVI/BTMEVI/BTECVI/BTELVI/BTCSVI

Term-End Examination

December, 2012

BME-009 : COMPUTER PROGRAMMING AND APPLICATION

Time : 3 hours   *Maximum Marks : 70*

*Note :   Attempt **any five** questions. All questions carry **equal** marks. Use of scientific calculator is **permitted**.*

1.   (a)   If 0.333 is the approximate value of $\frac{1}{3}$, find

            2x7=14

            absolute, relative and percentage errors.

     (b)   Find the real positive root of

                $3x - \cos x - 1 = 0$

            by Newton - Raphson method correct to six decimal places.

2.   (a)   Use Crout's method to solve the following simultaneous equations.   **2x7=14**

                $x + y + z = 3$

                $2x - y + 3z = 16$

                $3x + y - z = -3.$

(b) Solve the following equations using the Gauss' elimination method.

$$2x_1 + x_2 + x_3 = 10$$
$$3x_1 + 2x_2 + 3x_3 = 18$$
$$x_1 + 4x_2 + 9x_3 = 16$$

3. (a) Use Jacobi's iteration method, to solve the following systems of equations.　　**2x7=14**

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25.$$

(b) Using Regula-Falsi method, compute the real root of the equation

$$xe^x = 2$$

in (0.8, 0.9) correct to five decimal places.

4. (a) Use Lagrange's interpolation formula to compute f(4) from the following data :　　**2x7=14**

x :	1	2	3	5
y :	0	7	26	124

(b) Evaluate $\int_0^1 \frac{1}{1+x^2}\, dx$ with $h = \frac{1}{6}$ by

(i) Trapezoidal rule

(ii) Simpson's $\frac{1}{3^{rd}}$ rule. Hence compute the value of π.

5. (a) What are the output of following two codes fragments ? Justify your answer. 2x7=14

    // Version 1   // Version 2
    int f = 1, i = 2 ;   int f = 1, i = 2 ;
    while (t + i < = < 5)   do {
                                 f* = i ;
    f* = i ;   } while (+ + i < 5) ;
    cout < < f ;   cout < < f ;
        :   :
        :

   (b) What is the difference between global variable and local variable ? Give an example to illustrate the same.

6. (a) Write a C^{++} program to sum the sequence 2x7=14

   $$\text{sum} = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \text{.......} + \frac{1}{100!}$$

   (b) What are Nested structures ? Give an example.

7. (a) Identify and explain the error(s) in the following code fragment : 2x7=14

       float a [ ] = {11.02, 12.13, 19.11, 17.41};
       float *J, *k ;
       j = a ;
       k = a + 4 ;
       j = j*2 ;
       k = k/2 ;
       cout <<"j=" <<*j<", *k = "<<k<<"\n">
       :

(b)   Give the output of the following program ;

```
# include < iostream .h >
Struct Point
{ int X, Y ;
} ;
void show (Point P)
{
cout << P.X << ':' << P.Y << end |;
}
void main ( )
{
        Point U = {20,10}, V, W, ;
        V = U ;
        V.X + = 20 ;
        W = V
        U.Y + = 10 ;
        U.X + = 5 ;
        W.X - = 5 ;
        Show (U) ;
        Show (V) ;
        Show (W) ;
}
```

8.   (a)   Write a C^{++} program to input a number.
            If the number is even, print its square
            otherwise print its cube.   **2x7=14**

     (b)   Write a C^{++} program to calculate area of a
            circle, a rectangle or a triangle depending
            upon user's choice.