No. of Printed Pages : 4

BME-009

02515

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

Term-End Examination

June, 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) Obtain a quadratic polynomial approximations to $f(x) = e^{-x}$ using Lagrange's interpolation method, taking three points $x = 0, \frac{1}{2}, 1$. **7+7**

(b) Find the value of y when $x = 1.5$ from the following table :

X :	1	5	7	10	12
Y :	0.6931	1.7918	2.0794	2.3979	2.5649

Using Newton's divided difference formula.

2. (a) Using Lagrange's interpolation formula, express the function : $\frac{x^2+2x+3}{(x+1)\times(x-1)}$ as sums of partial fractions. 7+7

(b) Use Stirling's formula to find U_{32} from the following table :

$U_{20}=14.035$, $U_{25}=13.674$, $U_{30}=13.251$,

$U_{35}=12.734$, $U_{40}=12.089$, $U_{45}=11.309$

3. (a) Given $y^1=x^2+y^2$ with $x=0$, $y=1$. Find $y(0.1)$ by fourth order Runge-Kutta method. 7+7

(b) Calculate the values of the function $y=1-\cos x$ at $X=82°$ and $X=1°$. Calculate the absolute and the relative errors of the results.

4. (a) Find a root of a equation $X \log_{10} x=4.77$ by Newton Raphson Method correct up to five decimal places. 7+7

(b) A sphere of sandal wood 3 meters in diameters, floating in water sinks to the depth of x meters given by the equation :

$x^3-3x^2+2.5=0$.

Find x correct to two decimal places, using Horner's method.

5. (a) Solve the following system of equations by matrix inverse method : **7+7**

$$x + 2y + 3z = 10$$

$$x + 3y - 2z = 7$$

$$2x - y + z = 5$$

(b) Solve the equations by Gauss Elimination Method.

$$2x_1 + x_2 + x_3 = 4$$

$$x_1 - x_2 + 2x_3 = 2$$

$$2x_1 + 2x_2 - x_3 = 3$$

6. (a) Find the inverse of matrix : $A = \begin{pmatrix} 5 & 8 & 2 \\ 0 & 2 & 1 \\ 4 & 3 & -1 \end{pmatrix}$ **7+7**

Using the LU decomposition method.

(b) Solve the following system of equation by Cholesky Method :

$$2x_1 + x_2 - x_3 = 6$$

$$x_1 - 3x_2 + 5x_3 = 11$$

$$-x_1 + 5x_2 + 4x_3 = 13$$

7. (a) Write a C++ program that reads a temperature in Celsius degrees and prints the equivalent in Fahrenheit degrees : **7**

the formula $\frac{C}{5} = \frac{F - 32}{9}$

(b) (i) Explain the difference between a class and struct. 2

(ii) What is the difference between a pointer and an array ? 2

(iii) Explain the difference between a template class and class template. 2

(iv) How to access the memory address of a variable ? 1

8. (a) Write a C++ program which reads the value of A, B and C and compute the semi perimeter and area of the triangle, using the formula : $S=(A+B+C)/2$ 7

$$\text{Area} = \sqrt{S(S-A)\ (S-B)\ (S-C)}$$

(b) (i) Explain the difference between the following two declarations : 2

Int n1 = n ;

Int and n2 = n ;

(ii) What is wrong with the following code ? 2

Int and r = 22 ;

(iii) What is the difference between static binding and dynamic binding ? 2

(iv) Discuss the basic file input/output operators in C++. 1