B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) BTCLEVI/BTMEVI/BTELVI/BTCSVI/BTECVI

Term-End Examination,

December 2019

BME-009 : COMPUTER PROGRAMMING AND APPLICATIONS

Time : 3 Hours] *[Maximum Marks : 70*

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*Note : (i) Answer **any five** questions.*

*(ii) All questions carry **equal** marks.*

(iii) Use of scientific calculator is permitted.

(iv) Assume missing data, if any.

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1. a) If $N = \frac{4x^2y^3}{z^4}$ and $\Delta x = \Delta y = \Delta z = 0.001$, compute maximum relative error in N when $x = 1$, $y = 2$, $z = 3$. 7

b) Solve the following Linear equations with the help of Gauss elimination method. 7

$$2x + 4y + z = 3$$

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

$$x - y + z = 6$$

2. a) Solve the following linear equations by using Cramer's rule. 7

$$3x_1 + 2x_2 + x_3 = 7$$

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

$$5x_1 + 4x_2 - 2x_3 = 1$$

b) Solve the following Linear equations by Jacobi method, 7

$$2x + y + z = 4$$

$$x + 2y + z = 4$$

$$x + y + 2z = 4$$

3. a) Use the Bisection method to obtain a real root of the equation $x^3 - x - 1 = 0$. Correct to three decimal places. 7

b) Find the real root of the equation $x^4 - x - 9 = 0$ by Newton-Raphson method, correct to three decimal places. 7

4. a) Compute the Real root of the equation $x^3 + x - 1 = 0$ by Regula-Falsi method, correct to three decimal places. 7

b) Use Runge-Kutta method to find y when $x = 1.2$ insteads of $h = 0.2$ given that $\frac{dy}{dx} = x^2 + y^2$ and $y(1) = 1.5$. 7

5. a) Use Lagrange's interpolation formula to find the value of y, when $x = 10$, if the following values of x and y are given: 7

x:	5	6	9	11
y:	12	13	14	16

b) Using Newton's forward interpolation formula, find y at $x = 8$ from the following table: 7

x:	0	5	10	15	20	25
y:	7	11	14	18	24	32

6. a) Explain the concept of class and object with an example. 7

b) Write a C++ programme to calculate the surface area and volume of sphere of radius 'R'. Also print the values. 7

7. a) Write a C++ programme to find the roots of a quadratic equation $Ax^2 + Bx + C = 0$. 7

b) What is a Friend function in C++? Explain the need of friend function with an example. 7