

00622

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

Term-End Examination

June, 2019

**BME-009 : COMPUTER PROGRAMMING AND
APPLICATIONS**

Time : 3 hours

Maximum Marks : 70

-
- Note :**
- (i) *Attempt any five questions.*
 - (ii) *All questions carry equal marks.*
 - (iii) *Use of scientific calculator is permitted.*
-

1. (a) Find the real root of the equation : 7

$$x = \frac{1}{(x+1)^2} \text{ correct to four decimal places.}$$

- (b) The values of x and y are given below : 7

$$x : 5 \quad 6 \quad 9 \quad 11$$

$$y : 12 \quad 13 \quad 14 \quad 16$$

Find the value of y when $x=10$. Use Lagrange's interpolation formula.

2. (a) Find the real root of the equation : 7

$$x^4 + x^2 - 80 = 0$$

by Newton-Raphson method, correct to three decimal places.

- (b) Use Stirling's formula to find U_{32} from the following table : 7

$U_{20} = 14.035$	$U_{25} = 13.674$	$U_{30} = 13.257$
$U_{35} = 12.734$	$U_{40} = 12.089$	$U_{45} = 11.309$

3. (a) Using Lin-Bair Stow's method, obtain the quadratic factors of the following equation : 7

$$x^3 - 2x^2 + x - 2$$

- (b) Solve the system of equation : 7

$$3x_1 + 5x_2 = 8$$

$$-x_1 + 2x_2 - x_3 = 0$$

$$-3x_1 - 6x_2 + 4x_3 = 1$$

using Cramer's rule.

4. (a) Find the Inverse of matrix 7

$$A = \begin{bmatrix} 5 & 8 & 2 \\ 0 & 2 & 1 \\ 4 & 3 & -1 \end{bmatrix}$$

using LU decomposition method.

- (b) Use Gauss-Seidal method for solving the following system of equation : 7

$$\begin{bmatrix} 2 & -1 & 0 & 1 \\ -1 & 2 & -1 & 0 \\ 0 & -1 & 2 & -1 \\ 0 & 0 & -1 & 2 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$

5. (a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using 7

(i) Trapezoidal rule

(ii) Simpson's $\frac{1}{3}$ rd rule

- (b) Use Euler's method to find the solution of $y' = x + |y|$, given that $y(0) = 1$. Find the solution on $[0, 0, 8]$ with $h = 0.2$ 7
6. (a) Write a C++ program that reads a temperature in degrees Celsius and prints the equivalent in degrees Fahrenheit the formula $\frac{C}{5} = \frac{F-32}{9}$ 7
- (b) 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
- $$\text{Area} = \sqrt{S(S-A)(S-B)(S-C)}$$
- Also print A, B, C on one line and area on the next line.
7. (a) Write a C++ program that prints the following number in descending order : 7
- 1 2 4 8 16 32 64 128
- (b) (i) What is the difference between Pointer and Array ? 2
- (ii) How to access the memory address of a variable ? 2
- (iii) What is wrong in this code ? 2
- ```
if (x=0) cout <<x<<"=0\n";
else cout <<x<<"!=0\n";
```
- (iv) What is a Fall-through ? 1

8. (a) Write a C++ program to calculate the volume of a square pyramid given by the formula,  $\text{Volume} = \frac{1}{3} a^2 h$  where 'a' is the side of square. 'h' is the height of pyramid. 7
- (b) (i) What is the difference between a Class and Structure ? 2
- (ii) What is a derived data type ? Give an example. 2
- (iii) What is wrong in the following code ? 2
- ```
Char C='h';  
Char p=&c ;
```
- (iv) What is Null object ? 1
-