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**BICE-022**

00525

# B.Tech. CIVIL ENGINEERING (BTCLEVI)

## Term-End Examination

## June, 2019

## BICE-022 : COMPUTER APPLICATIONS IN CIVIL ENGINEERING

*Time : 3 hours* *Maximum Marks : **70***

***Note :*** *(i) Attempt any **seven** questions.*

*(ii) Scientific calculator is allowed.*

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

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**1.** Define normalized floating point representation of numbers and round off errors in representation. Find the sum of $0.123 \times 10^3$ and $0.456 \times 10^2$ and write the result in three digit mantissa form. **10**

**2.** Find a real root of the equation $x \log_{10} x = 1.2$ by Regula - Falci method correct to four decimal places. **10**

**3.** Solve the following system of equations by the LU decomposition method : **10**

$2x + 3y + z = 9$

$x + 2y + 3z = 6$

$3x + y + 2z = 8$

**4.** Use Gauss' forward formula to find a polynomial of degree four which takes the following values of the function $f(x)$ : **10**

| | | | | | | |
|---|---|---|---|---|---|---|
| $x$ | : | 1 | 2 | 3 | 4 | 5 |
| $f(x)$ | : | 1 | $-1$ | 1 | $-1$ | 1 |

5. Use Lagrange's formula to find $f(6)$ from the following table : 10

| $x$ | 2 | 5 | 7 | 10 | 12 |
|---|---|---|---|---|---|
| $f(x)$ | 18 | 180 | 448 | 1210 | 2028 |

6. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=6$ given that 10

| $x$ | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 |
|---|---|---|---|---|---|---|---|
| $y$ | 9.69 | 12.90 | 16.71 | 21.18 | 26.37 | 32.34 | 39.15 |

7. (a) Use Simpson's $\frac{1}{3}$ rule to find $\int_0^6 \frac{dx}{1+x^2}$ by dividing the interval of integration into 6 equal parts. 5

(b) Evaluate $\int_0^6 \frac{e^x}{1+x}\,dx$ using Simpson's $\frac{3}{8}$ rule by dividing the interval of integration into 6 equal parts. 5

8. Solve the equation $\frac{dy}{dx} = x + y$ with initial condition $y(0)=1$ by Runge - Kutta rule of fourth order, from $x=0$ to $x=0.2$ with $h=0.1$ 10

9. Discuss the following : 4x2½=10

(a) Standard form of Linear Programming Problem

(b) Unimodal Functions

(c) Fibonacci Numbers

(d) One Dimensional Minimization Problem

10. Discuss the Fibonacci Method and Golden Section Method and write the difference between these two methods. 10