DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – May 2019

Course: B. Tech in -Civil Engineering **Sem : IV**

Subject Name: Numerical Methods in Engineering **Subject Code:BTCVE404A**

Max Marks: 60 **Date:- 22/05/2019** **Duration:- 3 Hr.**

Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and mention it clearly.

Q.1 A) Solve the following equations by using Gauss Jordan method **6**

$2x_1 + 4x_2 - 6x_3 = -8$

$x_1 + 3x_2 + x_3 = 10$

$2x_1 - 4x_2 - 2x_3 = -12$

B) Write the working rule of Gauss Seidel method for the following equations **6**

$a_1x + b_1y + c_1z = d_1$

$a_2x + b_2y + c_2z = d_2$

$a_3x + b_3y + c_3z = d_3$

Q.2 A) If $dy/dx = x + y^2$ and $y = 1$ at $x = 0$, find an approximate value of y at $x = 0.2$ **6**
By Euler's modified method taking $h = 0.1$.

B) Using Secant method find the root of the equation $x^2 + 2x - 0.5 = 0$ upto 3 decimal places. **6**

Q.3 A) Find the polynomial f(x) by using Lagrange's formula and hence find f(3) for **6**

x	0	1	2	5
f(x)	2	3	12	147

B) A simply supported beam of span L and constant EI supports a concentrated load P at centre of span. Estimate maximum deflection in the beam. **6**

Q.4 A) Evaluate the following integral using Simpson's 1/3 rule **6**

1) $\int_{-1}^{1} e^x \, dx$ 2) $\int_{0}^{\frac{\pi}{2}} \sqrt{\sin x} \, dx$

undefined

B) Explain trapezoidal rule and Simpsons 3/8th rule. 6

Q.5 A) Fit a second order polynomial to the data in the table below: 6

x	1.0	2.0	3.0	4.0
y	6.0	11.0	18.0	27.0

(B) Calculate mean and standard deviation for the data 6

x	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
f(x)	5	7	10	16	11

Q.6 A) Write the algorithm for Bisection method 6

B) Write the algorithm for Newton Raphson Method 6

End