



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter 2023

Exam Seat No.:

Academic Year:2023-2024

Semester:I

Name of Programme:M.Tech

Pattern:2022

Name of Course:Numerical Methods in Structural Engineering

Course Code:CIV225101

Max. Marks:30

Duration:1 Hr.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question

Question No. 1 Attempt following Question

a)

Find roots of the equation correct to 5 decimal places using NRM.

(7) CO1

$$x^3 - 3x - 4 = 0$$

OR

b)

Using Gauss elimination method find x, y and z.

(7) CO1

$$9x + 3y + 4z = 9$$

$$2x + 8y - 3z = 9$$

$$2x - 3y + 10z = 26$$

- c) Write a MATLAB program to find roots of following equation using NRM. (8) CO5

$$x^3 - 3x - 4 = 0$$

OR

- d) Write a MATLAB program to find inverse of a 3x3 matrix. Assume suitable data. (8) CO5

Question No. 2 Attempt following Question

- a) Given the DE $\frac{dy}{dx} = xy + y^2$, $y(0)=1$ obtain $y(0.1)$ by Taylor's series method correct up to three decimal places. (7) CO2

OR

- b) Use Euler's method to solve $\frac{dy}{dx} = x + y$, $y(0)=0$ and find $y(1)$. Take $h = 0.2$. (7) CO2

- c) Using Runge Kutta fourth order method, solve $\frac{dy}{dx} = x + y$, $y(0)=1$. Find $y(0.1)$ and $y(0.2)$. (8) CO2

OR

- d) Using Runge Kutta fourth order method, solve $\frac{dy}{dx} = x + y^2$, $y(0)=1$. Find $y(0.1)$ and $y(0.2)$. (8) CO2