

School of Engineering
B.TECH Mechanical Engineering
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem IV - C1UC424B - Numerical methods

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) What is difference between direct methods and iterative methods. Give some examples K2 (2)
- 2) Define absolute error, relative error, percentage error. K1 (3)
- 3) Find the square root of 12 by using Newton Raphson method upto 3 decimal places. K2 (4)
- 4) If $u = \frac{4x^2y^3}{z^4}$ and errors in x, y, z be 0.001, compute the maximum absolute, relative, percentage error in u , when $x = 1, y = 1, z = 1$ K2 (6)
- 5) Find a root of the equation $x \cdot \log_{10} x = 1.9$ by secant method. Perform four iterations K3 (6)
- 6) Solve the following system of linear equations by Gauss Jordan method:
 $x + y + z = 9$, $2x - 3y + 4z = 13$, $3x + 4y + 5z = 40$ K3 (9)
- 7) Using Bisection method, find a root of the equation $x^3 - x - 1 = 0$. Perform six iterations. K4 (8)
- 8) A function $f(x)$ defined on the interval $(0, 1)$ is such that $f(0) = 0$, $f(1/2) = -1$, $f(1) = 0$. Find the quadratic polynomial $p(x)$ which agrees with $f(x)$ for $x = 0, 1/2, 1$. K4 (12)

OR

The population of a town in decennial census were given in the following table. K4 (12)

Year :	1921	1931	1941	1951	1961
Population (in thousand) :	46	66	81	93	101

Estimate the population for the year 1955 using Newton's backward and forward formulae and compare the results.