CODE: 17CD54101

M. Tech I Year I Semester Regular Examinations, February 2018

COMPUTATIONAL METHODS
(CAD/CAM)

Time: 3 hours Max Marks: 60

Answer all **five** units. (5 x 12 = 60 Marks)

UNIT-I

1. Use the Gauss-Seidel method to solve the following system

$$\begin{cases} 4x_1 + x_2 - x_3 = 3 \\ 2x_1 + 7x_2 + x_3 = 19 \\ x_1 - 3x_2 + 12x_3 = 31 \end{cases} \Leftrightarrow \begin{cases} x_1 = -1/4\, x_2 + 1/4\, x_3 + 3/4 \\ x_2 = -2/7\, x_1 - 1/7\, x_3 + 19/7 \\ x_3 = -1/12\, x_1 + 1/4\, x_2 + 31/12 \end{cases}$$

OR

2. Explain the relaxation method of numerical analysis.

UNIT-II

3. Provide the general scheme of Adaptive quadrature.

OR

4. Solve the following system:

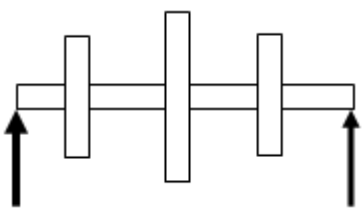
$y = -x - 3$
$x^2 + y^2 = 17$

UNIT-III

5. Calculate the integral of the function, f(x) = 2x in the interval (0,1) using Simpson's one third rule.

OR

6. Find the fundamental frequency of the simply supported beam of length l carrying three discs of mass $m, 2m$ and m equidistantly placed from the left end. Use Reyleigh method.



Continued in page 2

CODE: 17CD54101

UNIT-IV

7. How Crank–Nicolson method can be applied to diffusion problems?

OR

8. Calculate the integral of the function, $f(x) = x^2 + 1$ in the interval (1,5) using Simpson's three eight rule.

UNIT-V

9. Find the vertical distance covered by a rocket from t = 8 to t = 30 seconds given by

$$x = \int_{8}^{30} \left(2000 \ln \left[\frac{140000}{140000 - 2100t} \right] - 9.8t \right) dt$$

OR

10. The values of x and their corresponding values of y are shown in the table below

x	0	1	2	3
y	2	3	5	4

a) Find the least square regression line y = ax + b.
b) Estimate the value of y when x = 10.

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