FirstRanker.com

www.FirstRanker.com

www.FirstRanker.com

XUII INU.						

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech (Chemical Engg) (Sem.–5) NUMERICAL METHOD Subject Code : BTCH-501 M.Code : 70521

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Differentiate between 'Interpolation' and 'Extrapolation'.
- b) Define various types of errors in numerical computations.
- c) Write the Simpson's 3/8 rule
- d) Define significant digits. How many significant digits are there in 1.001?
- e) Write any disadvantage of Newton-Raphson method.
- f) Define algebraic equations and transcendental equations with example.
- g) Define forward operator Δ and shift operator E. Hence prove that $E = 1 + \Delta$.
- h) Define eigen values and eigen vectors of a matrix.
- i) Write the Langrage's interpolation formula.
- j) Write iterative methods to solve linear algebraic equations.



www.FirstRanker.com

SECTION-B

- 2. Evaluate $\int_{0}^{6} \frac{dx}{1+x^2}$ using Trapezoidal rule and Simpson's 1/3 rule taking h = 1.
- 3. Solve the following system of equations by using the relaxation method :

$$12x + y + z = 31$$

$$2x + 8y - z = 24$$

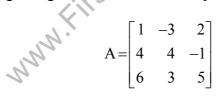
$$3x + 4y + 10z = 58.$$

- 4. Fit a straight line to the given data : y(-4) = 4, y(1) = 6, y(2) = 10, and y(3) = 8 by the method of least squares.
- 5. Find the cubic curve that passes through the points (-1, -8), (0, 3), (2, 1) and (3, 2) using Newton divided difference formula.
- 6. From the following table find the values of y' and y'' at x = 0:

<i>x</i> :	0	1	2	3	4	5				
<i>y</i> :	4	8	15	, ZO	6	2				
No.										



7. Determine the largest eigen value and the corresponding eigen vector of the matrix



By power method.

8. a) Use the method of triangularization to solve the system of equations

```
2x + y + 4z = 12
8x - 3y + 2z = 20
4x + 11y - z = 33
```

b) Find a real root of the equation $f(x) = \cos x - 2x + 3 = 0$ by fixed point iteration method correct upto three decimal places.



www.FirstRanker.com

9. a) Using Runge-Kutta fourth order method to find y (0.4) given that

$$y' = \frac{y^2 - x^2}{y^2 + x^2}, \ y(0) = 1$$

With h = 0.2

b) Solve the following system

$$x^{2} - 2xy + 9.62 = 0,$$

$$xy - 2y^{2} + 14.97 = 9,$$

by Newton-Raphson method with the initial values $x_0 = 2$ and $y_0 = 2$.



NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.