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SEAT No. :

P62

Oct./TE/Insem.-181

[Total No. of Pages : 2

T.E. (Chemical)

CHEMICAL ENGINEERING MATHEMATICS

(2015 Course) (Semester - I) (309341)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer any 3 questions.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Assume suitable data, if necessary.
- 4) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is permitted.

Q1) Perform four iterations of the Newton Raphson method to find the smallest positive root of the equation $f(x) = x^3 - 5x + 1 = 0$. [10]

OR

Q2) Find the root of equation $f(x) = x^3 - 4x - 9$ using bisection method in 4 stages. [10]

Q3) Solve the following system of equations using the Gauss elimination with partial pivoting [10]

$$\begin{aligned}x_1 + 10x_2 - x_3 &= 3 \\2x_1 + 3x_2 + 20x_3 &= 7 \\10x_1 - x_2 + 2x_3 &= 4\end{aligned}$$

OR

P.T.O.

Q4) Find the solution of the system of equations correct to three decimal places, using the Gauss-Seidel iteration method. **[10]**

$$45x_1 + 2x_2 + 3x_3 = 58$$

$$-3x_1 + 22x_2 + 2x_3 = 47$$

$$5x_1 + x_2 + 20x_3 = 67$$

Q5) The outflow chemical concentration from a completely mixed reactor is measured as

$t, \text{ min}$	0	2	4	6	8	12	16	20
$C, \text{ mg/m}^3$	10	20	30	40	60	72	70	50

For an outflow of $Q = 12\text{m}^3/\text{min}$, estimate the mass of chemical that exits the reactor from $t = 0$ to 20 min. Use Trapezoidal Rule. **[10]**

OR

Q6) What is regression? Explain Linear Regression with example. **[10]**

