

Total No. of Questions : 6]

P13

SEAT No. :

TE/Insem./APR-16

[Total No. of Pages : 2

T.E. (Mechanical & Automobile)

302047 : NUMERICAL METHODS & OPTIMIZATION

(2015 Course) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.No. 1 or Q.No. 2, Q.No. 3 or Q.No. 4, Q.No. 5 or Q.No. 6.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Explain Convergence & Divergence in Numerical Methods. [4]

b) Using Newton Raphson Method, find the real root of $x \log_{10} x = 1.2$, correct upto five decimal places. Take initial guess as 2. [6]

OR

Q2) a) Find the root of equation $x^3 - 5x + 8 = 0$ using successive approximation method. Do five iterations. [4]

b) Draw the flowchart for Bisection Method. [6]

Q3) Solve the following equation using Gauss Elimination Method. Do partial pivoting. [10]

$$x + 3y + 5z = 2$$

$$3x + 2y + 4z = 7$$

$$2x + y + z = 4$$

OR

Q4) a) Solve the following simultaneous equation by using Gauss Seidal Method. Do 4 iteration. [5]

$$3x + 8y + 29z = 71; 83x + 11y - 4z = 95; 7x + 52y + 13z = 104$$

b) Solve the following equations using Thomas Algorithm Method. [5]

$$x + 2y = 3$$

$$2x + 3y + z = 4$$

$$2y - z = 1$$

P.T.O.

Q5) Solve using Simplex method

Maximize, $z = 500x + 600y$

Subjected to condition

$$x + 2y \leq 15$$

$$3x + 2y \leq 18$$

$$x, y \geq 0$$

OR

Q6) a) Minimize cost, $z = 400x + 800y$

Subjected to condition

$$6x + 2y \geq 12$$

$$2x + 2y \geq 24$$

$$x, y \geq 0$$

Use graphical method.

b) Explain degeneracy to identify key row & key column. [4]

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