Total No. of Questions : 6]

SEAT No. :

P13

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TE/Insem./APR-16
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 $x^3 - 15x + 8 = 0$ 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 Thamos Algorithm Method. **[5]**

$$x + 2y = 3$$
$$2x + 3y + z = 4$$
$$2y - z = 1$$

P.T.O.

Q5) Solve using Simplex method **[10]**

Maximize, $z = 500x + 600y$

Subjected to condition

$$x + 2y \leq 15$$
$$3x + 2y \leq 18$$
$$x, y \geq 0$$

OR

Q6) a) Minimize cost, $z = 400x + 800y$ **[6]**

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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