

Total No. of Questions :12]

SEAT No. :

P2180**[5058]-12**

[Total No. of Pages : 3

T.E. (Mechanical /Automobile)
COMPUTER ORIENTED NUMERICAL METHODS
(2008-Course)(Semester-I) (302045)

*Time : 3 Hours]**[Max. Marks :100**Instructions to the candidates:*

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer any three questions from each section.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *figures to the right side indicate full marks.*
- 5) *Use of Calculator is allowed.*
- 6) *Assume Suitable data if necessary.*

SECTION-I

- Q1)** a) Find a root of $y=x^3-3x-5$ correct to four decimal places using iteration method. [8]
- b) Draw a flowchart for simpson's 3/8 Rule of integration. [7]

OR

- Q2)** a) Draw a flowchart for modified Newton Raphson method. [7]
- b) A curve is drawn to pass through the points given by the following table. [8]

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bonded by the curve, using trapezoidal rule and Simpson's 1/3 rd rule.

P.T.O.

- Q3)** a) Draw flowchart for Newton's Forward Difference Interpolation method. [7]
 b) Find $f(9)$ using Lagrange's Interpolation. [8]

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

OR

- Q4)** a) Write a note on Inverse interpolation and explain it with suitable example. [7]
 b) Draw flowchart for Lagrange's Interpolation. [8]

- Q5)** a) Draw a flow chart for solving system of linear simultaneous equations by Gauss elimination method. [10]

- b) Using Gauss Seidel method, solve the following set of simultaneous equations upto three decimal place accuracy. Do Partial Pivoting. [10]

$$X + 3Y + Z = 10$$

$$X + 2Y + 5Z = 12$$

$$4X + Y + 2Z = 16$$

OR

- Q6)** a) Draw a flow chart for solving system of linear simultaneous equations by Gauss Seidel method. [10]

- b) Solve the following simultaneous equations by Gauss Seidal Method. Five iterations only. [10]

$$2x+3y+10z = 27.1, 5x+ y-z=4.7, x +8y + 2z = 15.7$$

SECTION-II

- Q7)** a) Write a note on Error Propagation and types of errors. [7]

- b) If x and y are connected by the relation $x = ax^2 + by^2$ Find the values of a & b using least square criteria. [8]

OR

- Q8)** a) Derive the equation to fit a straight line using least square criteria. [7]

- b) Equation of the best fitting curve is of the type $y = a * b^x$. Find the values of constants a and b , by fitting a curve through the following points. [8]

x	1	3	4	6	9
y	0.8400	0.4116	0.2888	0.1410	0.0480

- Q9)** a) Draw a Flow Chart for 'Euler's Method'. [7]
 b) Given $dy/dx = 3x + y/2$, with initial condition $y(0) = 1$, find $y(1.0)$ taking step size as 0.5. Use Runge Kutta fourth order method. [8]

OR

- Q10)** a) Draw a flow chart for Runge Kutta fourth order method. [7]
 b) Solve the equation $dy/dx = (y+x*y)/(x)$. Given the initial condition $y(1.0) = 2.718$. Find $y(1.2)$ taking a step size of 0.1 and accuracy = 0.001. Use modified Euler's Method. [8]

- Q11)** a) Draw a flow chart for solving 1 D Heat equation. [8]
 b) Second order differential equation is $y'' - 64y + 10 = 0$, subject to condition $y(0) = 1, y(1) = 1$, take $h = 1/3$, Solve by finite difference method and find $y(1/3)$ and $y(2/3)$. [12]

OR

- Q12)** a) Draw a flow chart for solving parabolic equation. [10]
 b) Describe the procedure to solve a partial differential equation by explicit method. State its limitations. [10]

