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**S.E. (Electrical) (II Sem.) EXAMINATION, 2018**  
**NUMERICAL METHODS AND COMPUTER PROGRAMMING**  
**(2012 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

- N.B. :—** (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.  
(ii) Neat diagrams must be drawn wherever necessary.  
(iii) Figures to the right indicate full marks.  
(iv) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

- Q1) A)** Explain Descartes' rule of sign with suitable example. [6]  
**B)** Give the syntax of (i) if (ii) if-else (iii) do-while (iv)while loop in C-language [7]

**OR**

- Q2) A)** What are the different data types in C language? Explain each in detail with data ranges. [6]  
**B)** Using Birge-Vieta method find the root of following equation at the end of third iteration with initial value  $p_0 = 1.5$  [7]

$$f(x) = x^6 - x^4 - x^3 - 1 = 0$$

- Q3) A)** Derive the equations for curve fitting with parabola using least square technique. [6]  
**B)** Use Lagrange's formula to find the value of  $y$  at  $x = 6$  from following data [6]

$x$	3	7	9	10
$y$	168	120	72	63

**OR**

- Q4) A)** Find the value of  $y$  from following data at  $x = 2.65$  using appropriate interpolation method [6]

$x$	-1	0	1	2	3
$y$	-21	6	15	12	3

P.T.O.

B) Apply Secant method, to find smallest positive root of  $x - e^{-x} = 0$ .

Take  $x_0 = 0$  &  $x_1 = 1$  [6]

Q5) A) Find largest eigen value and corresponding eigen vector of  $\begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$  by using the power method at the end of five iterations with initial vector  $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$  [7]

B) Explain Gauss Jordan method for matrix inversion. [6]

OR

Q6) A) Solve the following system of equation using Gauss-Seidel method at the end of third iteration with  $x = y = z = 0$  [7]

$$28x + 4y - z = 32$$

$$2x + 17y + 4z = 35$$

$$x + 3y + 10z = 24$$

B) Explain Gauss Elimination method to solve linear simultaneous equation. What do you mean by pivoting in elimination method and why it is required? [6]

Q7) A) A curve is passing through the points as given in following table. [6]

x	1	2	3	4	5	6	7	8	9
y	0.2	0.7	1	1.3	1.5	1.7	1.9	2.1	2.3

Find

(i) The area bounded by the curve, the x-axis,  $x = 1$  and  $x = 9$ .

(ii) The volume of the solid generated by revolving this area about x-axis.

Use Simpson's (1/3)rd method

B) Explain Taylor's series method for solution of ordinary differential equations [6]

OR

Q8) A) Using forth order RK method find (0.1) . [6]

$$\frac{dy}{dx} = \frac{1}{x+y} \text{ with } y(0) = 1 \text{ Take } h = 0.1$$

B) Using Newton Cote's formula, derive Simpson's  $\left(\frac{3}{8}\right)^{\text{th}}$  rule for numerical integration. [6]