Seat	
No.	

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S.E. (Electrical) (Second Semester) EXAMINATION, 2014 NUMERICAL METHODS AND COMPUTER PROGRAMMING (2012 PATTERN)

Time: Two Hours

Maximum Marks: 50

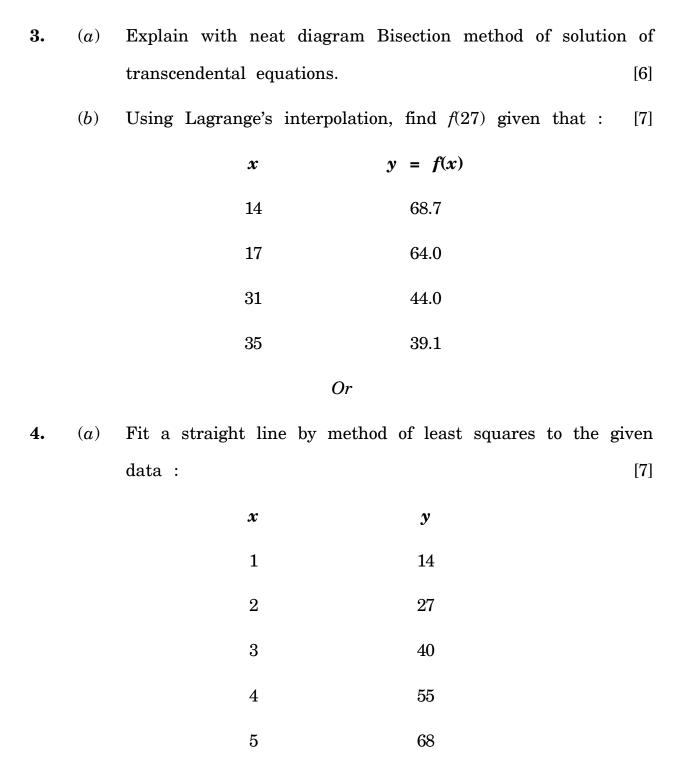
- **N.B.** :— (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and Q. 7 or Q. 8.
 - (ii) Neat diagrams must be drawn wherever necessary.
 - (iii) Figures to the right indicate full marks.
 - (iv) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
 - (v) Assume suitable data, if necessary.
- 1. (a) List various types of operators used in C. Give examples of each type. [6]
 - (b) What is an error in computation? Define absolute and relative error. [6]

Or

- **2.** (a) What is user defined function in C? Explain with example. [6]
 - (b) Using Birge Vieta method, find the real root of the equation : $x^3 + 2x^2 5x 6 = 0.$

Perform two iterations. Take $P_0 = 1.3$. [6]

P.T.O.



(b) Derive formula for Newton's Forward Difference Interpolation method. [6]

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- **5.** (a) Explain Gauss Jordan method for solution of system of linear simultaneous equations. [6]
 - (b) Using Jacobi iterative method solve the following system of linear simultaneous equations.

Take:

$$x^{(0)} = v^{(0)} = z^{(0)} = 0.$$

Perform 5 iterations:

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110.$$

$$Or$$
[7]

- **6.** (a) Explain Gauss Seidel iterative method of solution of system of linear simultaneous equations. [6]
 - (b) Using power method, find the largest eigenvalue correct upto 2 decimal places. Given that:

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ and } X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}.$$
 [7]

[6]

7. (a) Using Taylor's Series method, solve the following ordinary differential equation to obtain y(0.1) and y(0.2).

Given that:

$$\frac{dy}{dx} = x^2y - 1$$
 and $y(0) = 1$.

Truncate the series after first five terms.

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(b) Derive Simpson's 3/8th formula as a special case of Newton Cote's quadrature formula for numerical integration. [6]

Or

- 8. (a) Explain with neat diagram, Modified Euler's method of solution of ordinary differential equation. [6]
 - (b) Evaluate the given integral using Simpson's 1/3rd rule. Take h = k = 0.2,

$$I = \int_{2}^{2.4} \int_{4}^{4.4} xy \ dx \ dy \ . \tag{6}$$