(*c*) Establish the relation between abscissae u and $\bar{u}$. Where u and $\bar{u}$ are abscissae of Gauss-Legendre integration for

$$\int_{-1}^{1} f(u)\,du \text{ and } \int_{0}^{1} f(\bar{u})\,d\bar{u} \text{ respectively.}$$

(*d*) Derive the general relation between forward and backward differences.

(*e*) Discuss the symmetry of a matrix and the nature of Eigenvalues.

(*f*) Calculate the root of the following equation using Secant Method, correct upto three decimal places.

$$x^2 - 5x = -4$$

(*g*) The function $y = \tan(x)$ is tabulated as

x	0	$\pi/16$	$\pi/8$
$y = \tan(x)$	0	0·1989	0·4142

Compute the numerical derivative at $x = \pi/18$ by applying numerical differentiation technique.

(*h*) With the help of above tabulated data compute

$$\int_{0}^{\pi/8} \tan(x)\,dx$$

using Simpson's 1/3 rule.

(*i*) Give example of Hyperbolic, Parabolic and Elliptical Partial Differential equations.

(*j*) Discuss the difference between Gauss and Gauss-Jordan elimination methods.

2. (*a*) Calculate abscissaes and weights of Gauss -Legendre integration for $n = 4$ points. 5

(*b*) Compute

$$\int_{0}^{1} x\,dx$$

using the above calculated abscissae and weight values. 5

3. (*a*) Obtained the Gauss-Jordan elimination method to solve the solution of a linear system. 5