

MAJOR TEST

PHL 800

Time : 2 hours

Max. Marks : 50,

Q.1. Describe Gauss-quadrature formula for numerical integration. (10)

Q.2. Solve numerically the integral equation

$$\phi(x) = x + \int_0^1 (4xt - x^2) \phi(t) dt$$

to find $\phi(\frac{1}{2})$. Solve the equation analytically also. (10)

Q.3. What is Monte-Carlo simulation technique? Describe the exponential and Gaussian distribution used in Monte-Carlo simulation. (10)

Q.4. A function $f(x)$ has the values

| | | | | |
|--------|------|------|------|------|
| x | 0.1 | 0.2 | 0.3 | 0.4 |
| $f(x)$ | 0.76 | 0.58 | 0.44 | 0.35 |

Obtain a least square fit to this data of the form

$$f(x) = a e^{-2x} + b e^{-3x} \quad (10)$$

Q.5. Use the inverse power method to find the lowest eigen value and corresponding eigen vector of the matrix

$$\begin{Bmatrix} 0 & 11 & -5 \\ -2 & 17 & -7 \\ -4 & 26 & -10 \end{Bmatrix}$$

(10)