b) State advantages and disadvnatages of boundary element method. 7+3

3. a) Describe a quadrature method to solve the Fredholm's integral equation numerically :

$$f(x) - \int_a^b K(x,t)f(t)dt = \phi(x).$$ 4

b) Solve the integral equation by the method of degenerate kernels :

$$f(x) - \lambda\int_0^{\pi} \sin(x-u)f(u)du = \cos x$$

with $\lambda = 1$. 6

MASTER OF SCIENCE EXAMINATION, 2019

(2nd Year, 2nd Semester)

MATHEMATICS

ADVANCED NUMERICAL ANALYSIS (THEORY)

UNIT - 4.1

Time : One hours Full Marks : 20

(Notation / Symbols have their usual meanings)

Answer ***any two*** of the following questions :

1. a) Give the basic idea of weighted residual approach and hence derive Galerkin method to solve a boundary value problem.

b) Use Galerkin method to find a two-parameter approximate analytical solution of the differential equation

$$\frac{d^2u}{dx^2} + u - x^2 = 0, \quad 0 < x < 1$$

subject to the boundary conditions

$$u(0) = 0, \quad u'(1) = 1.$$ 5+5

2. a) Determine the shape functions for a typical triangular element by using Lagrange's liner interpolating polynomial and hence show that the shape functions are same as the area coordinates.