Roll No: | | | | | | | | | | |

The Assam Royal Global University, Guwahati

ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY (RSET)

M.TECH SE, 2nd Semester

Semester End Examination, June 2023

Course Title: Fem In Structural Engineering

Course Code : CEE024C20S1

Time: 3 Hours **Maximum Marks: 70**

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

Section – A

1. Attempt **all questions**. (Maximum word limit 50) **2 x 8**

a. Write a short note on Discretization.
b. What are the types of solutions in FEM?
c. When is Galerkin method used in FEM?
d. Write in brief about the weighted residual method.
e. In general element formulation, what are compatibility conditions?
f. Describe isoparametric formulation.
g. When is a body said to be in plane stress?
h. Summarize in a few lines about distortion energy theory.

Section – B

2. Attempt **any one** of the following: **12 x 1**

a. In details write step by step procedure of FEM.

b. Write a short note on the Finite Element method. Derive the global finite element matrix for two spring systems as shown in Fig1

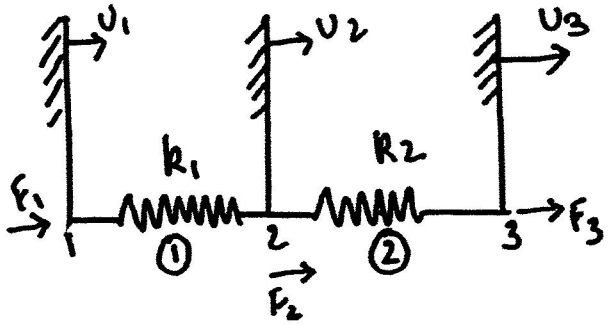

Fig 1

3. Attempt **any two** of the following: **7 x 2**

a. What are the steps for weighted residual method?
b. For a cantilever beam with uniform varying load q= ax and length L, find the approximate solution.
c. For a flexural beam element find the element stiffness matrix.

4. Attempt **any two** of the following: **7 x 2**

a. Find the interpolation function for a triangular element for 3 nodal linear structures.
b. Find the interpolation function for an 8 node brick element.
c. Derive the interpolation functions for higher order one dimensional elements