

Enrollment No.....



Faculty of Engineering
End Sem (Even) Examination May-2022
CE5EL03 Finite Element Method

Programme: M.Tech.

Branch/Specialisation: CE

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. The higher order elements are also called as- **1**
 (a) Complex elements (b) Compound element
 (c) Linear element (d) None of these
- ii. FEM is used for- **1**
 (a) Complicated Structures
 (b) Structures Consist of different Materials
 (c) Structures having irregular shape
 (d) All of these
- iii. In weighted residual technique, the methods adopted are- **1**
 (a) Point collocation method (b) Least squares method
 (c) Galerkin's method (d) All of these
- iv. Rayleigh – Ritz method is based on- **1**
 (a) Minimum/maximum P.E. Approach
 (b) Direct approach
 (c) Gaussian elimination
 (d) None of these
- v. Tetrahedral is a- **1**
 (a) One-dimensional element (b) Two-dimensional element
 (c) Three-dimensional element (d) None of these
- vi. Displacement function in FEM is taken as- **1**
 (a) Trigonometric function (b) Polynomial function
 (c) Numerical function (d) None of these
- vii. A six noded triangular element is known as- **1**
 (a) Linear strain triangular element
 (b) Constant strain triangular element
 (c) Variable strain triangular element
 (d) Differable strain triangular element

- viii. A triangular plane stress element has ____ degree of freedom. **1**
 (a) 3 (b) 4 (c) 5 (d) 6
- ix. The geometry and other parameters of an element in terms of only one spatial coordinate then the element is- **1**
 (a) Two-dimensional (b) One-dimensional
 (c) Three-dimensional (d) None of these
- x. The art of subdividing a structure into a convenient number of smaller components is called- **1**
 (a) Discretization (b) Numbering of nodes
 (c) Both (a) & (b) (d) Continuum

- Q.2 i. Define node and element in finite element method. **3**
 ii. Describe various steps of finite element method. **7**
 OR iii. Compare finite element method and finite difference method. **7**
- Q.3 i. Write equation of equilibrium in finite element method. **2**
 ii. Explain the principle of Rayleigh- Ritz method with diagram. **8**
 OR iii. Explain method of Gaussian elimination with diagram. **8**
- Q.4 i. Write one-dimensional and two-dimensional polynomial function. **3**
 ii. Explain different shapes of elements with diagram. **7**
 OR iii. Write different types of isoparametric formulation with different dimensional modelling. **7**
- Q.5 i. Explain Lagrange interpolation function for one-dimensional element with diagram. **4**
 ii. Explain isoparametric formulation for one-dimensional and two-dimensional element. **6**
 OR iii. Derive numerical integration method for one-dimensional and two-dimensional element **6**
- Q.6 Attempt any two:
 i. Explain constant strain triangle with diagram. **5**
 ii. Explain quadratic strain triangle elements with diagram. **5**
 iii. Explain linear strain triangular element with diagram. **5**

P.T.O.

Scheme of Marking



Faculty of Engineering End Sem (Even) Examination May-2020 Finite Element Method (T) - CE5EL03 (T)	
Programme: M.Tech.	Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	A	1
	ii)	D	1
	iii)	D	1
	iv)	A	1
	v)	C	1
	vi)	B	1
	vii)	B	1
	viii)	D	1
	ix)	D	1
	x)	A	1
Q.2	i.	For Define Node give 1 marks and element in FEM give 1 marks	
	ii.	For each steps of FEM give 1 marks	
	iii.	For each Compare FEM and FDM give 1 marks	
Q.3	i.	For correct equation of equilibrium give 2 marks	
	ii.	For each principle of Rayleigh- Ritz method.give 1 marks	
OR	iii.	For correct Explain method of Gaussian elimination.give 3.5 marks and 3.5 marks for equation derive	
Q.4	i.	For each one dimensional and two dimensional polynomial function give 1.5 marks	
	ii.	For each Shapes Of Elements With Diagram give 2 marks	
OR	iii.	For each types of isoparametric formulation with different dimensional modelling give 2 marks	

Q.5	i.	For lagrange interpolation function for one dimension give 2 marks and 2 marks for diagram	
	ii.	For each isoparametric formulation for one and two dimensional element give 3 marks	
OR	iii.	For each numerical integration method for one dimensional and two dimensional element give 3 marks	
Q.6			
	i.	For explain Explain constant strain triangle give 2.5 marks and 2.5 marks for diagram	
	ii.	For explaiquartic strain triangle give 2.5 marks and 2.5 marks for diagram	
	iii.	For explai linear strain triangle give 2.5 marks and 2.5 marks for diagram	
