



Department of Mechanical Engineering

ME 8692 – Finite Element Analysis

Unit I – Introduction - MCQ Bank

1. What is a matrix?

- a) Group of elements
- b) Array of elements**
- c) Group of columns and rows
- d) Array of numbers

Answer: b

2. Which of the following is a row vector?

a) [0 1 2]

b) $\begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$

c) $\begin{bmatrix} 0 & 1 \\ 1 & 2 \end{bmatrix}$

d) None of the above

Answer: a

3. $(A B C)^T =$ _____

a) $(C B A)^T$

b) $B^T C^T A^T$

c) $C^T B^T A^T$

d) $A^T B^T C^T$

Answer: c

4. The derivative of Ax with respect to variable x_p is given by _____

a) $d/dx(A x)=x_p$

b) $d/dx(x_p)=A x$

c) $\int A x=x_p$

d) $\int x_p=Ax$

Answer: a

5. A symmetric matrix is called _____, if all its Eigen values are strictly positive i.e., greater than zero.

a) Negative definite

b) Positive definite

c) Co- definite

d) Alternative definite

Answer: b

6. A $A^{-1}=A^{-1}A$ is a condition for _____

- a) Singular matrix
- b) Nonsingular matrix
- c) Matrix inversion**
- d) Ad joint of matrix

Answer: c

7. A positive definite symmetric matrix A can be decomposed into form $A=LL^T$ this decomposition is called _____

- a) Cholesky**
- b) Rayleighs
- c) Galerkins
- d) Potential energy

Answer: a

8. $\text{Det}(A-\lambda I)=0$ is a _____

- a) Characteristic equation**
- b) Matrix equation
- c) Inversion of matrix
- d) Cholesky's equation

Answer: a

9. $\begin{bmatrix} 2 & 1 & 3 \\ 0 & 8 & 4 \\ 0 & 0 & 2 \end{bmatrix}$ is a _____

- a) Principle diagonal matrix
- b) Upper triangular matrix**
- c) Lower triangular matrix
- d) Singular matrix

Answer: b

10. $A = \begin{bmatrix} 3 & 2 & 1 \\ 4 & 5 & -8 \\ 10 & 0 & 5 \end{bmatrix}$ Then $\det(A) =$

- a) 120
- b) -80
- c) -175**
- d) 0

Answer: c

11. From the following, which type of element is not two dimensional?

- (A) Rectangle
- (B) Quadrilateral
- (C) Parallelogram
- (D) Tetrahedron**

Answer D

12. From the following, which type of element is not three dimensional?

- (A) Hexahedron
- (B) Quadrilateral**
- (C) Rectangular prism
- (D) Tetrahedron

Answer B

13. For truss analysis, which type of elements are used?

- (A) Triangle
- (B) Bar**
- (C) Rectangle
- (D) Parallelogram

Answer B

14. To solve the FEM problem, it subdivides a large problem into smaller, simpler parts that are called

- (A) finite elements
- (B) infinite elements
- (C) dynamic elements
- (D) static elements

Answer A

15. The art of subdividing the structure into a convenient number of smaller elements is known as

- _____ .
- (A) assemblage
 - (B) continuum
 - (C) traction
 - (D) discretization

Answer D

16. The sum of the shape function is equal to

- (A) 0
- (B) 0.5
- (C) 1
- (D) 2

Answer C

17. A triangular plane stress element has how many degrees of freedom?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

Answer D

18. Number of displacement polynomials used for an element depends on _____ .

- (A) nature of element
- (B) type of an element
- (C) degrees of freedom
- (D) nodes

Answer C

19. On gathering stiffness and loads, the system of equations is given by

- (A) $KQ=F$
- (B) $KQ \neq F$
- (C) $K=QF$
- (D) $K \neq QF$

Answer A

20. The finite element method is mostly used in the field of

- (A) structural mechanics
- (B) classical mechanics
- (C) applied mechanics
- (D) engineering mechanics

Answer D

21. At fixed support, the displacements are equal to

- (A) 1
- (B) 2
- (C) 3
- (D) 0

Answer D

22. In FEA, the sub domains are called as _____ .

- (A) Particles
- (B) Molecules
- (C) Elements
- (D) None

Answer C

23. The numbers of node for 1 D element are

- (A) 1
- (B) 2
- (C) 3
- (D) 0

Answer B

24. Finite element analysis deals with _____ .

- (A) Approximate numerical solution
- (B) Non-boundary value problems
- (C) Partial differential equations
- (D) Laplace equations

Answer A

25. Stiffness matrix depends on
- (A) Material
 - (B) Geometry
 - (C) Both material and geometry
 - (D) None of the above

Answer C