## Department of Mechanical Engineering
## Innovative Teaching Methods

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| Activity Title | Quiz |
| Faculty Name/Department | Mr. Mohan S R / Mech |
| Mapped Course Name & Code | ME8692 Finite Element Analysis |
| Date | 17-03-2023 |
| Benefitted Students (Year / Sem / Dept) | III / VI / Mech |
| Topic | Two-Dimensional Problem Modelling |
| Description | I have tried to make the questions relevant toward the evaluation of the engineer who has a background in finite element analysis. Saying that, knowing the answers to this quiz doesn't imply that one is capable of building accurate simulations, merely that one is heading in the right direction and has a good sense of humor. *(Rule: No passing Questions)* |
| Course Outcomes (CO) | CO3: Apply finite element formulations to solve two-dimensional scalar and torsion Problems |
| Performance Indicator (PI) | 1.3.1 |
| Mail ID (for review) | mech.mohan@msajce-edu.in |
| Activity Photos |  |

**Topics/ Questions:**

1. Each triangle formed by three nodes and three sides is called a _____
   a) Node
   b) Force matrix
   c) Displacement vector
   d) Element

2. The finite element method is used to solve the problem _____
   a) Uniformly
   b) Vigorously
   c) Approximately
   d) Identically

3. In two dimensional modeling each node has _____ degrees of freedom
   a) One
   b) Infinity
   c) Finite
   d) Two

4. In two dimensional analysis, stresses and strains are related as ____
   a) $\sigma = D\varepsilon$
   b) $\sigma = \varepsilon$
   c) Load values
   d) $\varepsilon = D\sigma$

5. In two dimensional modeling, elemental volume is given by _____
   a) $dV = tdA$
   b) $dV = dA$
   c) $f = [fx, fy]T$
   d) Trussky program

6. In deformation of the body, the symmetry of _____ and symmetry of _____ can be used effectively.
   a) Stress and strain
   b) Nodes and displacement
   c) Geometry and strain
   d) Geometry and loading

7. In two dimensional problems x-, y- co-ordinates are mapped onto _____
   a) x-, y- co-ordinates
   b) x-, $\xi$ – co-ordinates
   c) $\eta$-, y- co-ordinates
   d) $\xi$-$\eta$-Co-ordinates

8. The shape functions are physically represented by _____
   a) Triangular co-ordinates
   b) $\xi$-,$\eta$-Co-ordinates
   c) Area co-ordinates
   d) Surface co-ordinates

9. $A_1$ is the first area and $N_1$ is its shape function then shape function $N_1=$ ___
   a) A1/A
   b) A-A1
   c) A1+A
   d) A1

10. For plane stress or plane strain, the element stiffness matrix can be obtained by taking _____
    a) Shape functions, N
    b) Material property matrix, D
    c) Iso parametric representation, u
    d) Degrees of freedom, DoF

11. In the equation KQ=F, K is called as ____
    a) Stiffness matrix
    b) Modified stiffness matrix
    c) Singular stiffness matrix
    d) Uniform stiffness matrix

12. If the structure is divided into discrete areas or volumes then it is called an _____
    a) Structure
    b) Element
    c) Matrix
    d) Boundaries

13. In finite element modeling every element connects to _____
    a) 4 nodes
    b) 3 nodes
    c) 2 nodes
    d) Infinite no of nodes

14. Which relations are used in one dimensional finite element modeling?
    a) Stress-strain relation
    b) Strain-displacement relation
    c) Total potential energy
    d) Total potential energy; Stress-strain relation; Strain-displacement relation.

**Marks:**

| Group Name (if ITM is a group activity) | Reg No. | Topic | Marks |
|---|---|---|---|
| TEAM A | 311820114001 | | 20 |
| | 311820114002 | | |
| | 311820114003 | | |
| | 311820114004 | | |
| | 311820114005 | | |
| | 311820114006 | | |
| TEAM B | 311820114007 | | 20 |
| | 311820114008 | | |
| | 311820114009 | | |
| | 311820114010 | | |
| | 311820114011 | | |
| | 311820114012 | | |
| TEAM C | 311820114013 | | 10 |
| | 311820114014 | | |
| | 311820114015 | | |
| | 311820114016 | | |
| | 311820114017 | | |
| | 311820114018 | | |
| TEAM D | 311820114302 | Two-Dimensional Problem Modelling | 20 |
| | 311820114303 | | |
| | 311820114304 | | |
| | 311820114305 | | |
| | 311820114306 | | |
| | 311820114307 | | |
| TEAM E | 311820114308 | | 10 |
| | 311820114309 | | |
| | 311820114311 | | |
| | 311820114312 | | |
| | 311820114313 | | |
| | 311820114314 | | |
| TEAM F | 311820114315 | | 20 |
| | 311820114316 | | |
| | 311820114317 | | |
| | 311820114318 | | |
| | 311820114319 | | |
| TEAM G | 311820114320 | | 20 |
| | 311820114321 | | |
| | 311820114322 | | |
| | 311820114323 | | |
| | 311820114701 | | |

**Outcomes:**

Finite Element Analysis allows you to solve any engineering problem. This means you can verify a structure without any prototypes. So, this benefits you to understand the details of 2 dimensional elements / structure for the theoretical or practical solutions. And this improves the student's interest on the Internal Assessment Test.