Seat No. | | | | | | |

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# Finite Element Analysis

**P. Pages : 2**

**Time : Three Hours** **Max. Marks : 100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions out of eight questions.
5. Neat diagram must be drawn wherever necessary.
6. Figures to right indicate full marks.
7. Use of electronic pocket calculator is allowed.
8. Assume suitable data, if necessary.

**1.** a) Using energy method, derive an expression for element stiffness matrix of the two nodded one dimensional element. **12**

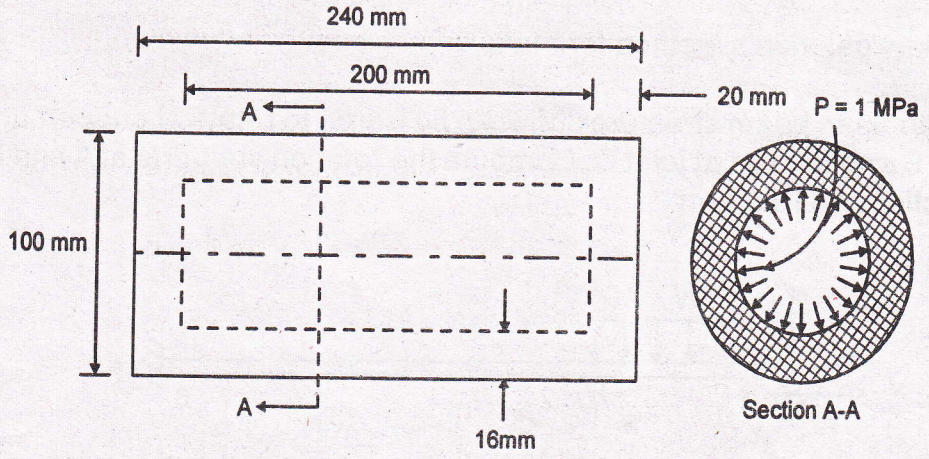
b) Explain the following : **8**

a) Importance of Boundary conditions.

**2.** a) Find the deformed configuration and stress distribution in the walls of closed cylinder as shown in fig. **16**

E = 200 Gpa

v = 0.3




b) Explain geometric nonlinearity. **4**

मळभ - 009

3. a) Find the temperature distribution in the square plate as shown in figure 5. Assume K = 30 W/m K, $T\infty$ = 50°C and q = 100 W/$m^3$. **20**

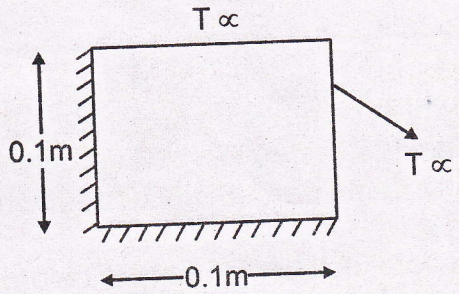



Figure 5

4. Determine the temperature distribution in a circular tapered fin varies the diameter from 4cm to 1cm over a length of 1m. The convection takes place on lateral surface as well as tip. The conductivity of the fin material is 200 W/m K, heat transfer coefficient over the surface is 980 W/m2K and T = 220°C. Assume base temperature is 1000°C. **20**

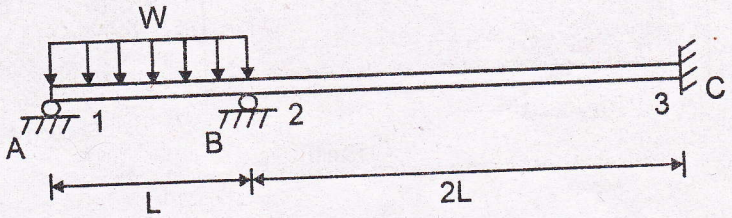
5. Obtain the Elemental Stiffness Matrix for Plane Truss Element in global coordinate system. **12**

Explain with examples, the plane stress and plane strain conditions, write stress-strain matrix for both conditions. **8**

6. With suitable examples explain the meaning and formulations of axisymmetric elements. State their applications. **12**

Explain galerkin's method for FEA. **8**

7. A Two Span beam structure shown in fig is free to rotate at support and A and B and is fixed at joint C. Compute the rotation supports at A and B and reaction at all support. **20**

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