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SEAT No. :

PB-164

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[6269]-378

T.E. (Mechanical) (Insem)

**COMPUTER AIDED ENGINEERING  
(2019 Pattern) (Semester - II) (302050)**

*Time : 1Hour]*

*[Max. Marks : 30*

*Instruction to Candidates:*

- 1) *Answer Q1 or Q2, and Q3 or Q4.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Derive the shape functions for two noded bar element and write its properties. [7]
- b) Explain in detail 1D, 2D and 3D element in FEM/FEA and justify what type of element can be used for structural analysis of line member. [8]

OR

- Q2)** a) The 1D element has a length of 200 mm. The temperatures at nodes 1 and 2 are 100°C and 40°C respectively. Evaluate the shape function associated with nodes 1 and 2, if the temperature is to be estimated at point P within the element, situated at 150 mm from node 1. Also calculate temperature at point P. [7]
- b) What is CAE? Explain the use of CAE in the product development. [8]

- Q3)** a) Explain element selection criteria in FEA. [7]
- b) How to improve FEA simulation accuracy based on mesh refinement? [8]

OR

- Q4)** a) Explain welded joint in FEA with practical consideration. [7]
- b) Explain following element quality criteria. [8]
- i. Jacobian
  - ii. Aspect ratio
  - iii. Warp
  - vi. Tetracollapse

