# Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

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| **Year and Program: 2020-21 B. Tech.** | **School of Technology** | **Department:** Mechanical Engg. |
| **Course Code: MET407.1** | **Course Title: Finite Element Analysis** | **Semester : VII** |
| **Day :Saturday Date:26/12/2020** | **End Semester Examination** | **Time:2 Hrs. Max Marks:50** |

**Instructions**: 1) All Questions are compulsory.
2) Figures to right indicate marks.

| | | | Marks | Bloom's Level | CO |
|---|---|---|---|---|---|
| **Q.1** | | **Answer the following (any Two)**– | | | |
| | a) | Explain in detail the steps used in FEA. | 8 | L2 | 407.1 |
| | b) | Compare analytical, numerical and experimental methods for solving engineering problems. | 8 | L3 | 407.1 |
| | c) | Explain different types of elements used in FEA | 8 | L2 | 407.2 |
| **Q.2** | | **Answer the following (any two) –** | | | |
| | a) | Discuss what is Plane stress and Plane strain conditions with example. | 8 | L2 | 407.4 |
| | b) | Derive the shape functions for constant strain triangle. | 8 | L3 | 407.3 |
| | c) | What are the important properties of shape functions? Show and explain the variation of shape function for linear element | 8 | L2 | 407.3 |
| **Q.3** | | **Answer the following (any two) –** | | | |
| | a) | Explain simplex, multiplex & higher order elements. | 9 | L2 | 407.6 |
| | b) | Determine the shape functions $N_1$, $N_2$and $N_3$ at the interior point 'P' for the triangular element shown in the figure. | 9 | L3 | 407.5 |

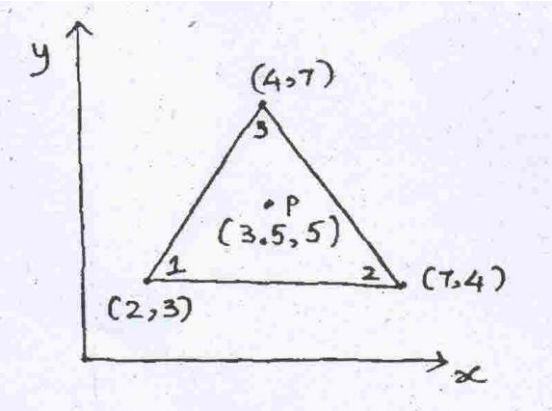



Fig. 3.b.1

c) Following figure shows a thermal distribution through composite wall. Assuming unit cross sectional area of each element, determine the global matrix for the composite wall as shown in the figure. Applying boundary conditions, find temperatures $T_2$ and $T_3$. 9 L3 407.5

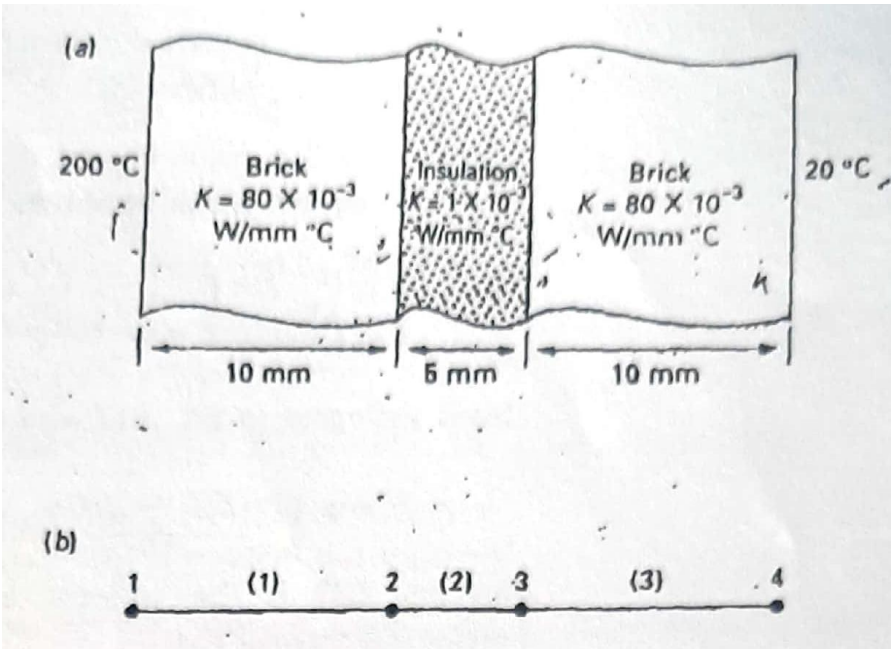



Fig. 3.c.1

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