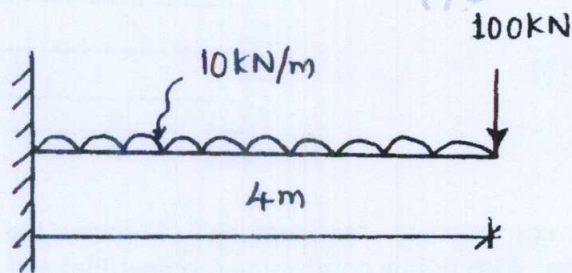


PART – B

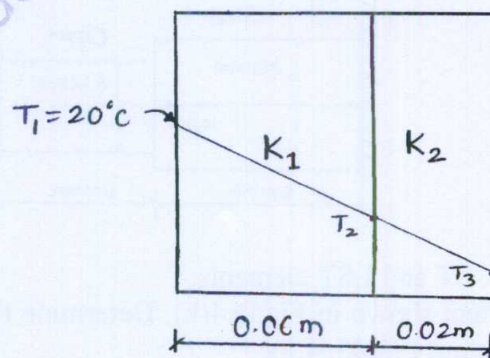
- 5 a. Derive the shape function for 4-noded tetrahedral elements. (10 Marks)
 b. Differentiate between Lagrange and serendipity family of elements, with neat sketches. (10 Marks)
- 6 a. What are iso-parametric, sub-parametric and super parametric elements? Explain with neat sketches. (09 Marks)
 b. Explain the three phases in finite element analysis. (06 Marks)
 c. List the 10-software packages used in FEA. (05 Marks)
- 7 a. What are Axisymmetric elements? Explain the axisymmetric triangular element, with neat sketch. (10 Marks)
 b. Determine the maximum deflection in the uniform cross-section of the cantilever beam shown in Fig.Q.7(b) by assuming the beam as a single element. Take $E = 7 \times 10^9 \text{ Pa}$, $I = 4 \times 10^{-4} \text{ m}^4$. (10 Marks)

Fig.Q.7(b)



- 8 a. Derive an expression for the thermal conductivity matrix for 1-D two noded heat element. (08 Marks)
 b. Determine the temperature distribution through the composite wall subjected to convection heat loss on the right side surface with convective heat transfer coefficient as shown in Fig.Q.8(b). The ambient temperature is -5°C . (12 Marks)

Fig.Q.8(b)



$$\begin{aligned}
 & h, T_{\infty} \uparrow\uparrow \\
 & K_1 = 6 \text{ W/m}^\circ\text{C} \\
 & K_2 = 20 \text{ W/m}^\circ\text{C} \\
 & h = 1000 \text{ W/m}^2\text{ }^\circ\text{C} \\
 & T_{\infty} = -5^\circ\text{C}
 \end{aligned}$$
