

limitations.

Q-4

Attempt all questions

- a) Show that the transformation matrix for a reflection about the line $Y = -X$ is equivalent to a reflection relative to the Y axis followed by a counterclockwise rotation of 90° . **07**
- b) Write short note on Importance of Homogeneous coordinate system in the form of matrix transformation. **07**

Q-5

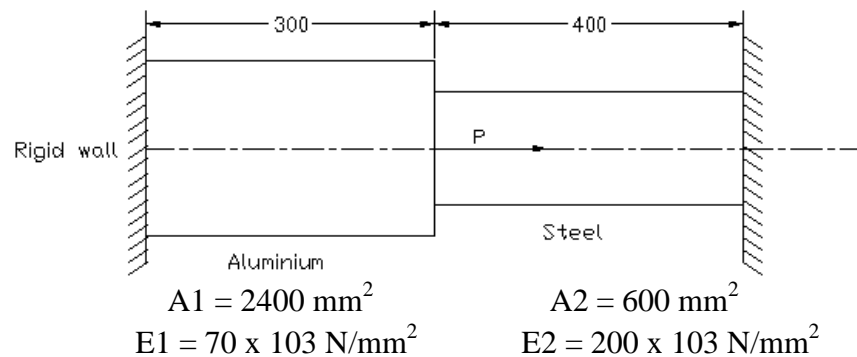
Attempt all questions

- a) State the characteristics of B spline curve. Compare it with Bezier curves. **07**
- b) Explain with neat sketch the major surface entities provided by CAD system. **07**

Q-6

Attempt all questions

- a) Explain basic steps involved in Finite Element Method and illustrate them with example. Give your comments on "FEM is an approximate method". **07**
- b) Consider the bar shown in Figure 1. An axial load $P = 200 \times 10^3 \text{ N}$ is applied as shown. Determine the following **07**
1. The nodal displacements
 2. Stress in each material
 3. Reaction forces.



Q-7

Attempt all questions

- a) Determine the nodal deflection, stresses in members and the reactions at supports of the three bar truss shown in Figure 2. **07**
- Area of each member = 800 mm^2
- $E = 200 \text{ GPa}$



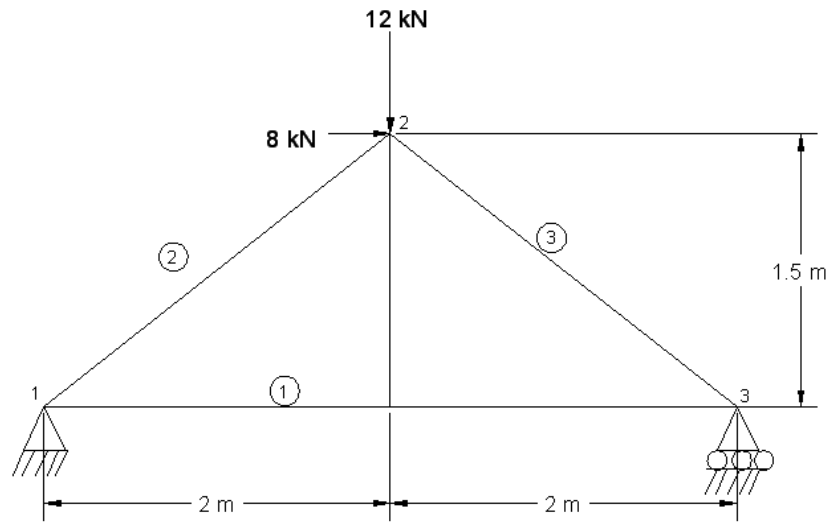


Figure 2

- b) Prepare an algorithm and write a C++ program for the design of Helical Compression Spring. **07**

Q-8

Attempt all questions

- a) Explain Johnson's method of optimum design stating basic steps and classification. **07**
- b) Explain relative advantages and disadvantages of CSG approach and B-rep approach. **07**

