

Total No. of Questions : 10]

SEAT No. :

P2235

[Total No. of Pages : 4

[5254]-566

**B.E. (Automobile)  
CAE & AUTOMATION  
(2012 Pattern) (Elective -I)**

*Time : 2.30 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*

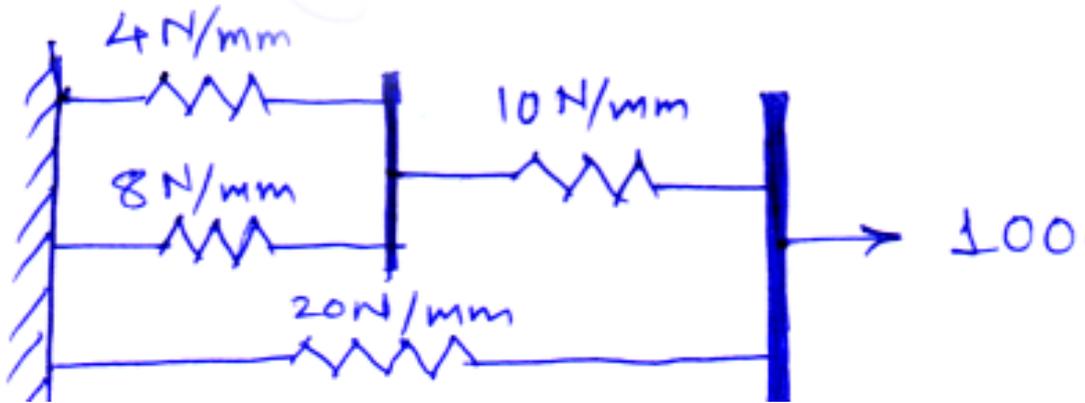
- Q1)** a) Compare CSG & B-rep. Explain the various boolean operations used in CSG with neat sketch. [6]
- b) A line joins two points (3,4,6) and (5,7,1) Find, [4]
- i) Parametric equation of line
  - ii) Tangent vector of the line
  - iii) Unit vector in the direction of line

OR

- Q2)** a) Explain the significance of Inverse Transformation & write down the inverse transformation matrices for. [4]
- i) Translation
  - ii) Rotation
- b) A triangle has co-ordinates A(1,2,3) B(4,3,4) and C(5,8,2). The three orthographic views of this triangle are to be projected write the transformation matrix and determine the co-ordinates of the views. [6]
- Q3)** a) A circle is passing through two end points A(6,4) and B(10,10) where AB is the diameter of the circle. Find the co-ordinates of the centre point, radius and parametric eq<sup>n</sup> of circle. Also find the co-ordinates of points on the circle at  $\theta = 30^\circ$  and  $\theta = 120^\circ$ . [6]

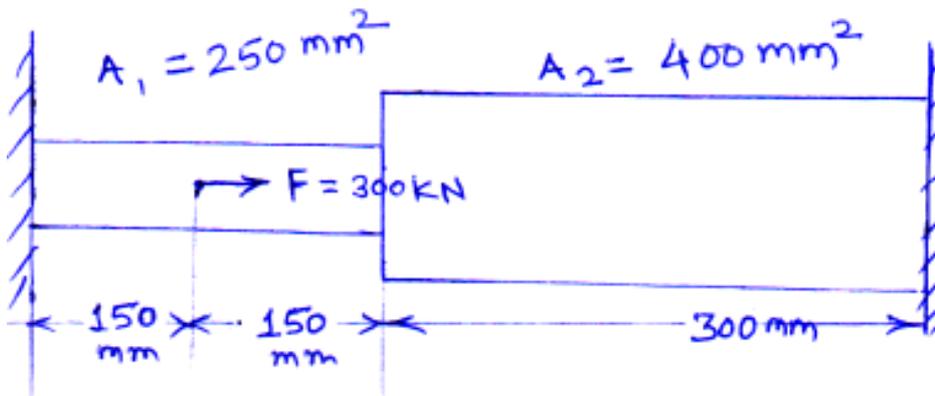
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- b) Figure shows a cluster of four springs one end of the assembly is fixed and a force of 1000N is applied at the other end using FEM determine the deflection of each spring. [4]



OR

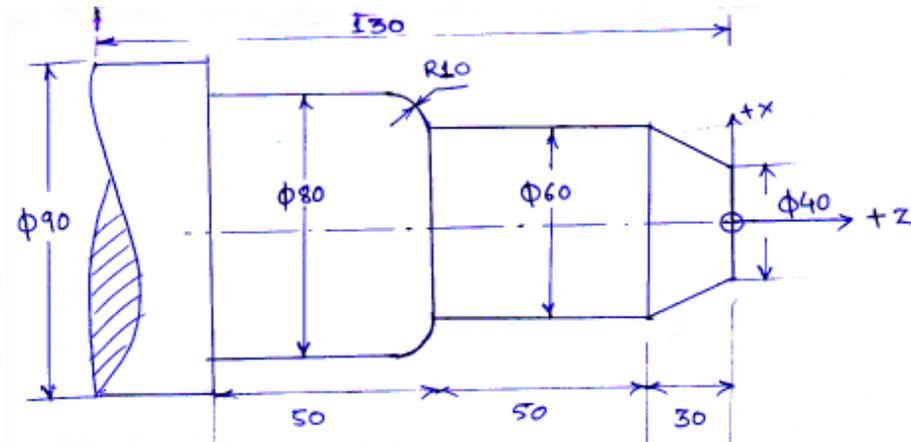
- Q4) A stepped steel bar ( $E = 200 \times 10^3 \text{ N/mm}^2$ ) is subjected to an axial load of 300 kN as shown in figure. [10]



Using FEM, determine,

- i) Nodal displacement
- ii) Stress in each element
- iii) Reaction forces at support

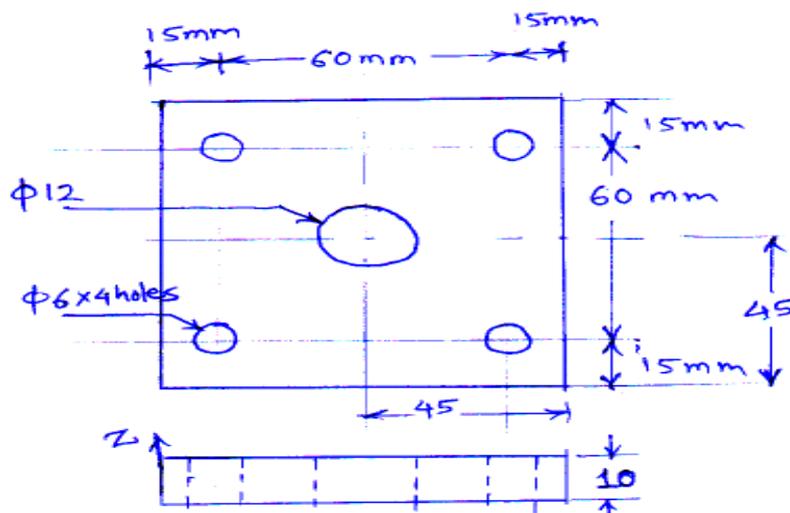
- Q5) a) List the different techniques of Rapid prototyping. Explain any one R.P. Technique in detail with neat sketch. [8]
- b) Develop a part program using G and M code to turn MS Job of size  $\phi 80 \times 120$  mm long as shown in figure. Assume suitable cutting parameters and various canned cycles to turn the final shape from the raw material of size  $\phi 90 \times 130$  mm. [10]



All dimensions are in mm.

OR

- Q6) a) What is DNC? Explain the elements of DNC. Describe limitations of DNC. [8]
- b) Write a part program to drill the holes in a component as shown in figure using CNC milling machine. Take cutting speed ( $v$ ) = 60 m/min & feed ( $f$ ) = 0.5 mm/tooth. Assume twisted drill with one complete helix teeth ( $z = 1$ ). [10]
- All dimensions are in mm.



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- Q7)** a) What is automation? Compare the types of Automation on the basis of , [8]
- i) Initial Investment
  - ii) Production rate
  - iii) Flexibility
  - iv) Production system
  - v) Tool setup
- b) What is Group Technology? Describe OPTIZ coding system in detail.[8]

OR

- Q8)** a) What is FMS? Explain different elements of FMS. [8]
- b) Write short note on AGV. Write down advantages and disadvantages of AGV. [8]
- Q9)** a) What is Gripper? State different types of grippers. Explain any one gripper in detail with neat sketch. [8]
- b) State and explain parameters used in robot specifications. [8]

- Q10)** Write short note on, [16]
- i) Robot programming Languages
  - ii) Sensors used in robots
  - iii) Application of robot in Industry
  - iv) Methods of robot programming