Total No. of Questions : 10]

P5545

SEAT No. :

[Total No. of Pages : 3

[5561]-533

B.E. (Mechanical)

CAD CAM AND AUTOMATION

(2015 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

    1)   *Neat diagrams must be drawn wherever necessary.*

    2)   *Figures to the right side indicate full marks.*

    3)   *Assume suitable data, if necessary.*

    4)   *Use of calculators is allowed.*

Q1) a)   Discuss the necessity of mapping geometric models.   **[5]**

    b)   Discuss Perspective projection of 3D model on 2D plane.   **[5]**

OR

Q2) a)   A line PQ with vertices P (2,5), Q (6, 7) is rotated by $40°$ in counter clockwise direction about a point P (2, 2) determine the new coordinates.

                                                                         [5]

    b)   Discuss Boundary Representation for solid modeling.   **[5]**

Q3) a)   Discuss types of synthetic surface modeling techniques.   **[5]**

    b)   A line is represented by the endpoints P (4, 6) and Q (-3, 12). If the value of Parameter u at P and Q is 0 and 1 respectively, determine the equation of the line. Also determine the coordinate of point on the line at u = 0.2, 0.4 and 0.6.   **[5]**

OR

Q4) A step bar as shown in fig. 1, The loading is initially done at 20°C. The temperature then rises to 60°C. Determine the nodal displacements and the elemental stresses developed using 1D elements.   **[10]**

    E_1 = 72 GPa, E_2 = 210 GPa. α_1 = 23 × 10^{-6} per °C, α_2 = 12 ×10^{-6} per °C.

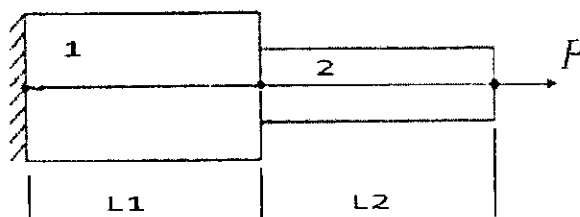 A_1 = 300 mm², A_2 = 200 mm², L_1 = L_2 = 150 mm, P = 10 kN.

Fig. 1

P.T.O.

Q5) a) Discuss use of subroutine and looping in CNC programing. **[8]**

b) Write CNC program using G and M codes to turn the component shown in fig. 2 having Stock size is ∅ 40mm. Use canned cycles wherever applicable. Assume suitable data for speed and feed. **[10]**
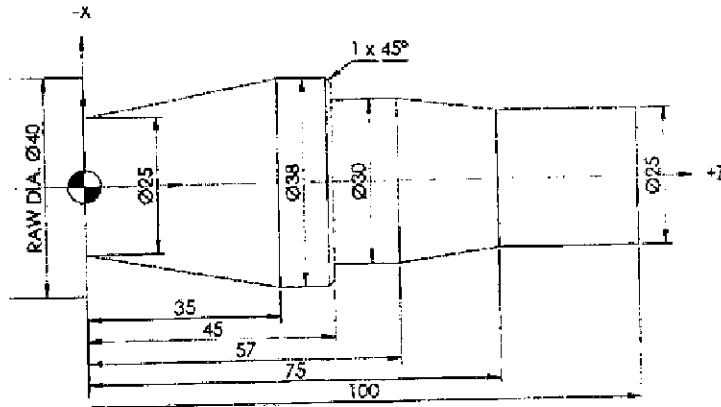
Fig. 2

OR

Q6) a) Write CNC program using G and M codes to contour, face and drill the component shown in fig. 3. Use canned cycles wherever applicable. Thickness of blank is 7mm. Assume suitable data for speed and feed.**[10]**
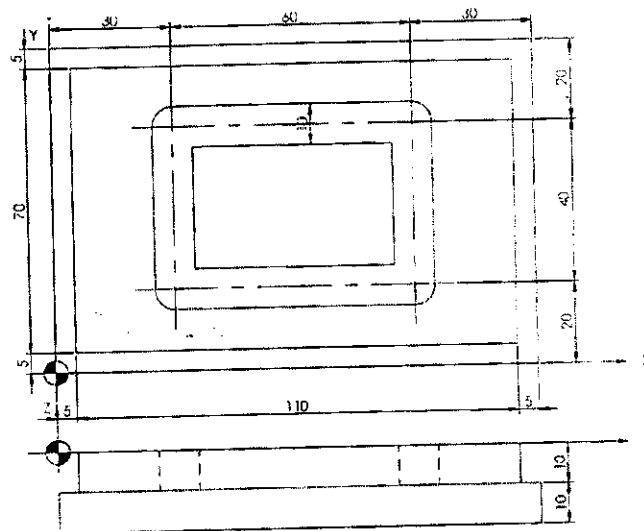
Fig. 3

b) Discuss coordinate system of Vertical Mechining Center and Horizontal Machining Center. **[8]**

[5561]-533   **2**

Q7) a) Disccuss the elements of Product Life Cycle. **[8]**

b) Discuss the application, advantages and disadvantages of Stereo Lithography. **[8]**

<div align="center">OR</div>

Q8) a) Explain working principle of Fused Deposition method for rapid prototyping. **[8]**

b) Discuss Collaborative Engineering with suitable example. **[8]**

Q9) a) Discuss hard and soft automation. **[8]**

b) Discuss robot anatomy with neat sketch. **[8]**

<div align="center">OR</div>

*Q10)*a) Discuss Concepts of Computer Integrated Manufacturing in brief. **[8]**

b) Discuss need and application of Automated guided vehicle. **[8]**

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