

Total No. of Questions : 10]

SEAT No. :

P5545

[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]

$E_1 = 72 \text{ GPa}$, $E_2 = 210 \text{ GPa}$. $\alpha_1 = 23 \times 10^{-6} \text{ per } ^\circ\text{C}$, $\alpha_2 = 12 \times 10^{-6} \text{ per } ^\circ\text{C}$.

$A_1 = 300 \text{ mm}^2$, $A_2 = 200 \text{ mm}^2$, $L_1 = L_2 = 150 \text{ mm}$, $P = 10 \text{ kN}$.

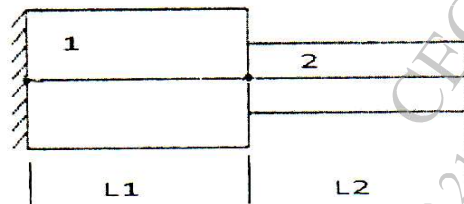


Fig. 1

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 $\varnothing 40\text{mm}$. Use canned cycles wherever applicable. Assume suitable data for speed and feed. [10]

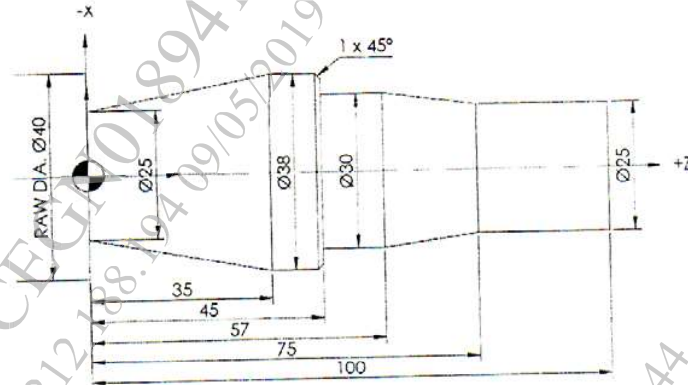


Fig. 2

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]

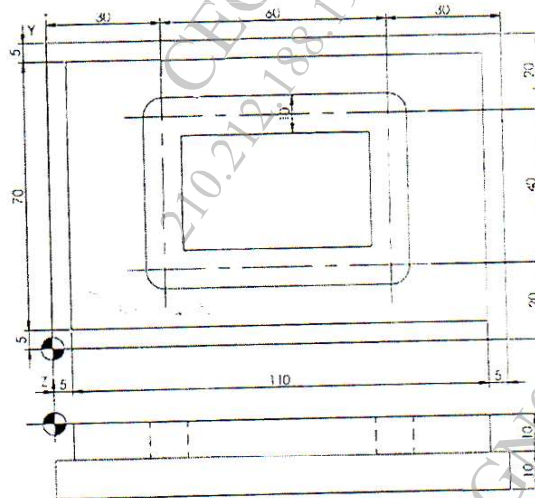


Fig. 3

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

- Q7) a)** Discuss the elements of Product Life Cycle. [8]
b) Discuss the application, advantages and disadvantages of Stereo Lithography. [8]

OR

- 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]

OR

- Q10) a)** Discuss Concepts of Computer Integrated Manufacturing in brief. [8]
b) Discuss need and application of Automated guided vehicle. [8]

