

Total No. of Questions : 12]

SEAT No. :

P731

[Total No. of Pages : 4

[4659] - 32

B.E. (Mechanical Engineering) (Semester - I)

CAD / CAM & AUTOMATION

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates :

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer Q. No. 1 OR Q.No.2, Q.No.3 OR Q.No. 4, and Q.No. 5 OR Q.No. 6 from section - I and Q.No.7 OR Q.No.8, Q.No.9 OR Q.No.10, Q.No.11 OR 12 from section - II.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of electronic pocket calculator is allowed.*
- 6) *Assume suitable data, if necessary and mention it clearly.*

SECTION - I

- Q1)** a) Explain co-ordinate systems used in geometric transformations [6]
b) Find a transformation matrix that transforms the given square ABCD to half with its size still remaining at the same position. The co-ordinates of the square are: A(1,1), B(3,1), C(3,3) and D(1,3) and centre at (2,2). Also find the resultant co-ordinates of square [10]

OR

- Q2)** a) Explain types of perspective projections used to project views in different forms. [6]
b) A triangle with vertices A (2,2), B (5,2) and C(4,7) is to be reflected about the line $y = 0.5x + 3$. Determine, [10]
i) Composite transformation matrix.
ii) New vertices of triangle ABC.

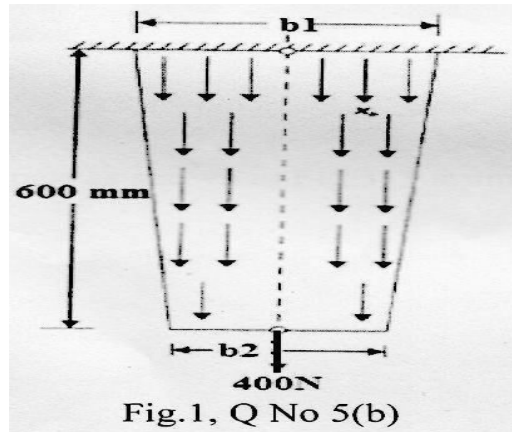
- Q3)** a) Compare between parametric and non parametric representation of curves [6]
b) Explain boundary representation modeling technique and enlist its advantages over other modeling techniques [10]

P.T.O.

OR

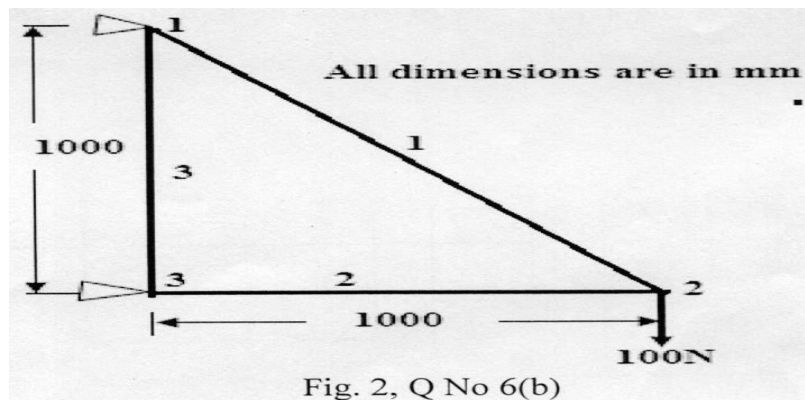
- Q4)** a) Explain briefly parametric representation of analytical surfaces [8]
b) Find the co-ordinates points of the Hermite cubic curve at $u = 0.25$, when curve start from points A(0,3) and ends at B(4,2). The tangents makes an angle of 45° and 90° with respect to horizontal from points A and B respectively [8]

- Q5)** a) Derive an elemental stiffness matrix for 1D bar element [6]
b) The thin plate of uniform thickness 20mm is as shown in fig 1. In addition to the self-weight, the plate is subjected to a point load of 400N. The young's modulus $E=2 \times 10^5 \text{N/mm}^2$ and density $\rho=0.8 \times 10^{-4} \text{N/mm}^3$. Find the stresses, displacement in the element and also determine the support reactions. Take $b_1 = 150\text{mm}$ and $b_2 = 75\text{mm}$. [12]



OR

- Q6)** a) Explain Plane stress and strain conditions with suitable Examples [6]
b) Fig. 2 shows truss consisting of three elements, where EA/L is equal to 1000 N/mm. Determine displacements at node 2 and reaction supports.[12]



SECTION - II

- Q7)** a) Explain G28, G03 and G13 with suitable examples. [6]
b) Write CNC program for the part as shown in Fig. 3. Assume suitable data. [12]

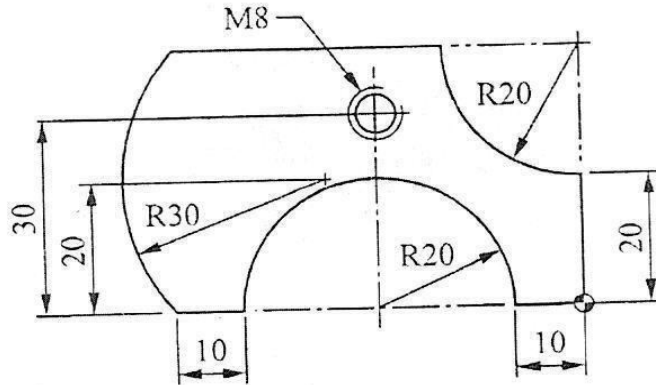


Fig. 3, Q No 7(b)

OR

- Q8)** a) Explain different types of motion control modes used in NC programming. [6]
b) Write NC part program for the part shown in Fig.4. Assume suitable data. [12]

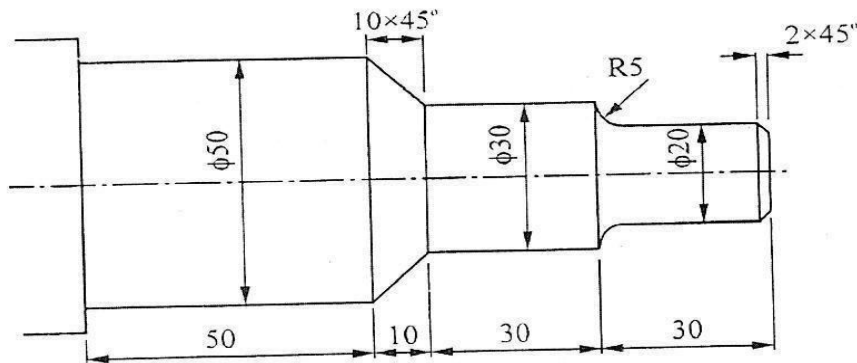


Fig. 4, Q No 8(b)

- Q9)** a) Define automation ? Explain different types of automation. [8]
b) Explain part classification and coding systems used in Group Technology [8]

OR

- Q10)** a) Differentiate between CNC and DNC [8]
b) Write a note on Adaptive control system [8]

Q11)a) Explain various factors to be considered during selection of end effectors. [8]

b) Explain vacuum gripper with the help of neat sketch and enlist its merits and demerits [8]

OR

Q12)a) Enlist classification of robots and explain servo controlled robot in brief. [8]

b) Explain the applications of robots in industries [8]

