Total No. of Questions : 12]

SEAT No. :

P752

[Total No. of Pages : 4

[4659] - 375

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

CAD /CAM & AUTOMATION

(2008 Course) (Elective - I (C))

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 Q.No. 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 the different types of coordinate systems used in CAD system and How the coordinates are mapped from one coordinate system to another. **[4]**

b) A triangle ABC represented as A (10, 10), B (40, 30) and C (10, 50). It is to be scaled by a factor of 0.8 about a point P (30, 30). Determine the composite transformation matrix and the new coordinates of the triangle. Plot the graph. **[12]**

OR

Q2) a) Write OpenGL syntax for the following commands. **[5]**
i) Rotation ii) Translation iii) scaling iv) Vertex and v) Color.

b) The co-ordinates of the center of circle are C (3, 4, 5) in WCS. Find the co-ordinates of Centre of circle with respect MCS. The orientation of MCS and WCS is shown in Fig.0l. **[6]**

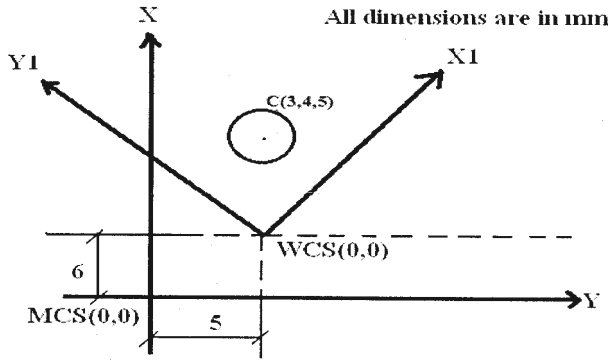

Fig.01: Q. No. 2(b)

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c) Explain homogeneous transformation matrices to represent orthographic projections. **[5]**

Q3) a) Compare between B_rep and C_rep modeling techniques. **[8]**

b) Write a parametric equation for a circle having end points of diameter as $P_1(2,3,6)$ and $P_2(8,7,6)$.Calculate the coordinates of circle. **[8]**

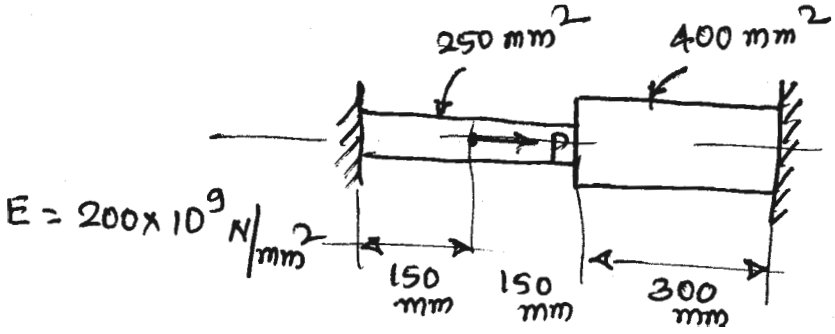
OR

Q4) a) Explain the different types of surface entities provided by the CAD/ CAM systems. **[8]**

b) The coordinates of four data points P_0, P_1, P_2 and P_3 are (2,2,0), (2,3,0), (3,3,0) and (3,2,0) respectively. Find the equation of the Bezier curve and determine the coordinates of points on curve for u = 0.0, 0.25, 0.5, 0.75and 1.0. **[8]**

Q5) a) Write short notes on mesh generation with suitable example. **[6]**

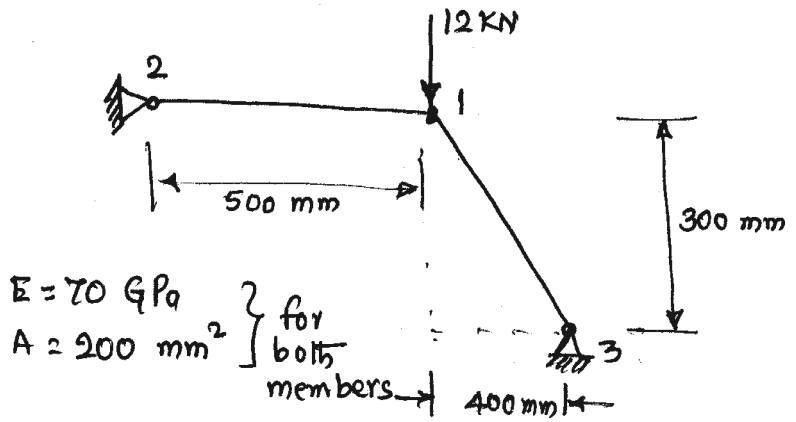
b) An axial load $P = 300\times10^3$N is applied at 20°G to the rod as shown in fig.1. Determine the nodal displacements elemental stresses and support reactions. **[12]**



OR

Q6) a) Derive the elemental stiffness matrix for truss element. **[6]**

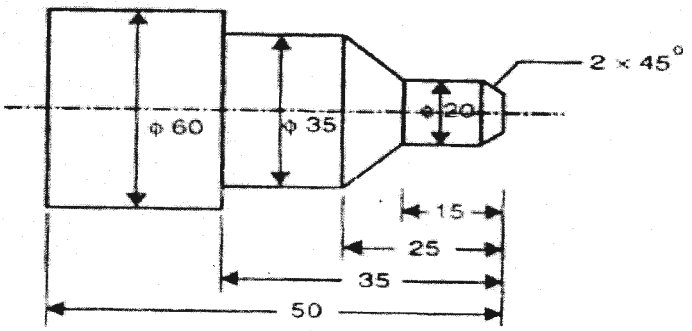
b) For the two-bar truss shown in fig.2 ,determine the displacement of node 1 and the stress in element 1-3. **[12]**



SECTION - II

Q7) a) Explain in detail motion control modes used in CNC machines. **[6]**

b) Write a CNC part program to turn a MS bar of size and shape as shown in following figure. Use canned cycles only for both rough turning and finish cut. Assume feed rate(0.8mm/rev.) and spindle speed(1000 RPM). **[12]**

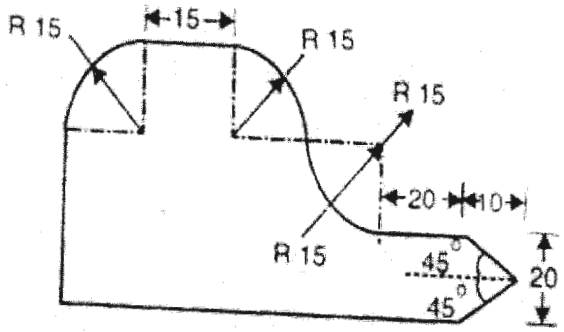


All dimensions are in mm

OR

Q8) a) Explain different types of zeros used in NC programming. **[6]**

b) Write a CNC part program to machine the end profile for the component as shown in fig. 3, assume suitable data for feed and speed. Also use left cutter radius compensation and incremental programming mode. Take thickness of plate 10mm. **[12]**



All dimensions are in mm

Q9) a) Explain the general configuration and functions of CNC system. **[8]**

b) Explain retrieval type of process planning with the help of flow charts. **[8]**

Q10)a) Enlist part classification and coding systems used in group technology and explain any one in detail. **[10]**

b) What are the limitations and advantages of flexible automation. **[6]**

Q11)a) Differentiate between Vacuum and adhesive type grippers. **[6]**

b) Write short notes on lead through programming methods. **[5]**

c) Explain SCARA robot configuration. **[5]**

OR

Q12)a) Explain the criteria for selection of gripper design. **[6]**

b) Explain the terms payload, precision and accuracy related to the robotics. **[6]**

c) Compare between hydraulic and pneumatic drives used in robots. **[4]**

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