Total No. of Questions :6]

SEAT No. :

P199

[Total No. of Pages :2

Oct./ BE/ Insem. - 515

B.E. (Mechanical)

CAD/CAM & AUTOMATION

(2015 Course) (Semester - I) (402042)

Time : 1 Hour] *[Max. Marks :30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Figures to the right side indicates full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of scientific calculator allowed.***

Q1) a) A Line PQ with P(1, 1,), and Q(8, 8) is rotated through 20º in CW about point P. Find concatenated transformation matrix and new coordinates of line. Also, represent transformation graphically. **[6]**

b) Compare Geometric Transformation and Geometric Mapping. **[4]**

OR

Q2) A triangle PQR is represented by P(2,3), Q(10, 3) and R(10, 12). Find concatenated transformation matrix and new coordinates of triangle PQR, if

a) Translation by 5 and 10 units resp. along X and Y axes.

b) Scaled by 1.5 times along X axis and 0.5 times along Y axis.

c) Rotated by 30º in CCW direction about perpandicular axis to XY plane and passing through origin O(0, 0).

Represent transformation graphically. **[10]**

Q3) a) What are the advantages of parametric representation of the curves in CAD system? **[4]**

b) The line L_1 has end points $P_1(2, 3, 4)$, $P_2(6, 8, 6)$ and line L_2 has end points $Q_1(1, 8, 4)$, $Q_2(8, 2, 6)$, then **[6]**

i) Find the parametric equations of the lines.

ii) Check, whether line L_1 is parallel to L_2.

OR

P.T.O.

Q4) a) Write parametric equation of a circle with center C(6, 4, 0) and Radius 6 units. Calculate coordinates of 3 equispaced points in first quadrant. **[6]**

b) Explain briefly parametric representation of analytical surfaces. **[4]**

Q5) The stepped bar shown in figure 1 is loaded axially by load P = 50kN, the modulus of elasticity of the bar is $0.7x10^5$ N/mm^2. Determine nodal displacement, elemental stress and reaction at support. **[10]**

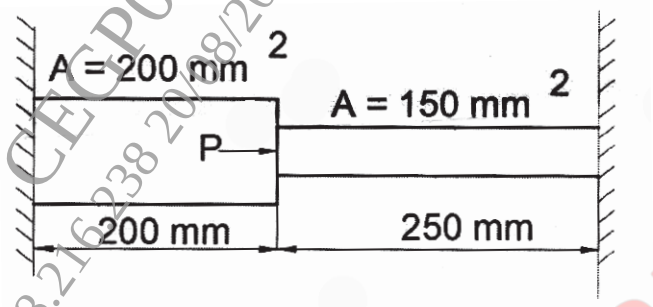

Figure 1: Qu 5

OR

Q6) a) For the Axially Loaded Spring System as shown in figure 2, determine **[6]**

i) Nodal displacements,

ii) Deformation of each spring

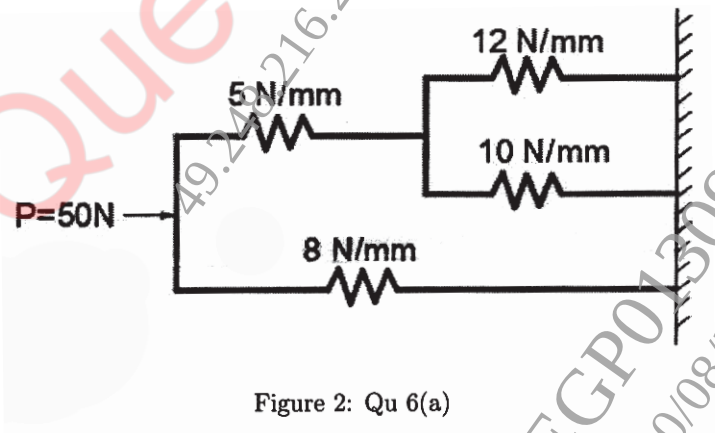

Figure 2: Qu 6(a)

b) Discuss Strain Displacement relations in FEA. **[4]**