

Total No. of Questions : 6]

SEAT No. :

P5800

[Total No. of Pages : 2

B.E./Insem./Oct.-515
B.E. (Mechanical)
CAD/CAM & AUTOMATION
(2015 Pattern) (Semester - I)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Figures to the right side indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Use of scientific calculator allowed.*

Q1) a) A Line PQ with $P(4, 6)$, and $Q(20, 30)$ is rotated by 30° CCW about point P . Derive concatenated transformation matrix and find new coordinates of points. **[6]**

b) Explain need of for mapping of geometric models. **[4]**

OR

Q2) Find the coordinates of triangle having vertex at $A(6,10)$, $B(6,25)$ and $C(16,25)$ when reflected along a line having Y intercept 4 and inclined at $+20^\circ$ with X axis. Find concatenated matrix and transformed coordinates of triangle with graphical representation. **[10]**

Q3) a) A line drawn from point $P_1(12,3,9)$ and has length of 10 units. The unit direction vector is $0.2\mathbf{i} - 0.8\mathbf{j} + 0.566\mathbf{k}$. Determine endpoint of line. **[4]**

b) Explain, in brief **[6]**

i) Geometry and Topology with suitable example,

ii) Coons Patch Surface.

OR

Q4) a) Determine the center point and radius of a circle passing through two diametrically opposite points $P_1(10,20)$ and $P_2(25,50)$. Determine parametric equation of circle and coordinates of four equispaced points in first quadrant. **[6]**

b) Explain B-spline Surfaces. **[4]**

P.T.O.

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

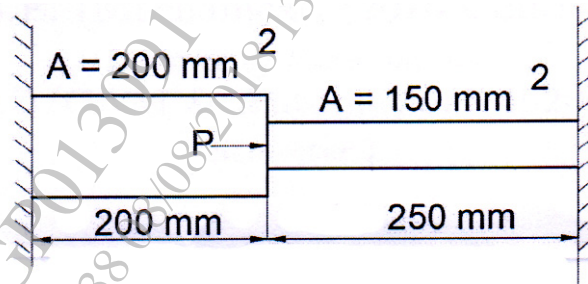


Figure 1 : Q.5

OR

- Q6) a)** For the Axially Loaded Spring System as shown in figure 2, determine (i) Nodal displacements, (ii) Deformation of each spring. [6]

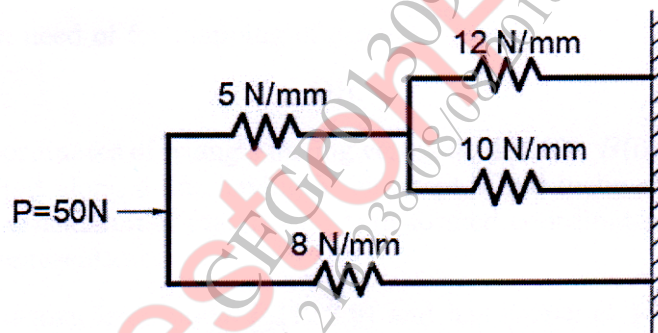


Figure 2 : Q 6(a)

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

