

Note:

1. Question 1 is Compulsory
2. Solve any three from remaining five
3. Figures to right indicate full marks
4. Assume suitable data if necessary

## Question

No.

Max.  
MarksQ.1 Explain **any four** of the following:

20

- (a) Viewing transformation.
- (b) Why is the rapid prototyping used?
- (c) Benefits of CIM
- (d) What is the need for concatenation of transformation?
- (e) Machining Centers and its types
- (f) Parameter optimization

Q.2 a) Determine the parametric representation of the line segment between the position vectors  $P_1 [1 \ 1]$  and  $P_2 [4 \ 5]$ . Find the slope and tangent vectors for the line.

10

b) Explain Selective Laser Sintering (SLS). How is it different from 3D printing?

10

Q.3 a) Explain significance of (i) Data capture techniques and (ii) Socio-techno-economic aspects with respect to Computer Integrated Manufacturing (CIM) and technology driven practices.

10

b) A Square with an edge length of 10 units is located on the origin with one of the edges at an angle of  $30^\circ$  with the X-axis. Calculate the new position of the square if it is rotated about the Z-axis by an angle of  $30^\circ$  in the clock wise direction.

10

Q.4 a) What are the different types of errors which may get introduced while converting the CAD solid model into RPT compatible format?

6

b) What are the major steps to solve the problem using FEM? Whether it gives exact answer? Why it has become popular?

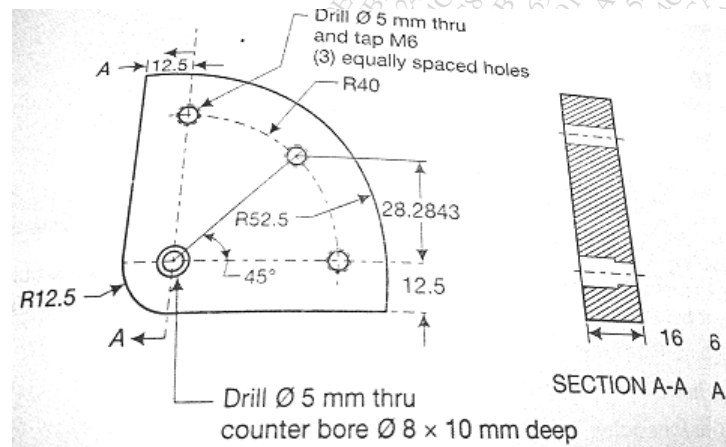
6

c) 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 Bezier curve and determine the coordinates of points on the curve for  $u = 0, 0.25, 0.5$  and  $0.75$ .

8

- Q.5 a) Explain CAE Case study based on modeling and analysis of structural (vibration analysis) system. 10
- b) Write complete part program using the ISO codes for the different holes present in the component as shown in figure. The operations and tools required are given below. 10

Op.No.	Description	Tools required
1	Drill one hole	Twist drill 5 mm dia
2	Counter bore one hole	End mill 8 mm dia
3	Drill three holes	Twist drill 5 mm dia
4	Tapping three holes	Machine Tap M6



- Q.6 Write short note on : 20
- Role of CAD/CAM in CIM.
  - Rapid Tooling
  - P & H refinement methods of CAE.
  - Feedback devices

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