

Con. 9418–12. KARJAT Dist. Raigad

(REVISED COURSE)

KR-1017

(4 Hours)

[Total Marks: 100

N.B.: (1) Question No. 1 is compulsory.

- (2) Attempt any four questions out of remaining six question.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary and clearly state the same.
- (5) Precise systematic presentation of answer will be given due weightage while assessing.
- 1. (a) Explain CAD tools required to support the different design phases.

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(b) The coordinates of four control points relative to a current WCS are given by  $P_0 = [2\ 2\ 0]^T$ ,  $P_1 = [2\ 3\ 0]^T$ ,  $P_2 = [3\ 3\ 0]^T$ , and  $P_3 = [3\ 2\ 0]^T$ . Find the equation

of the resulting Bezier curve. Also find points on the curve for  $u = 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}$  and 1.

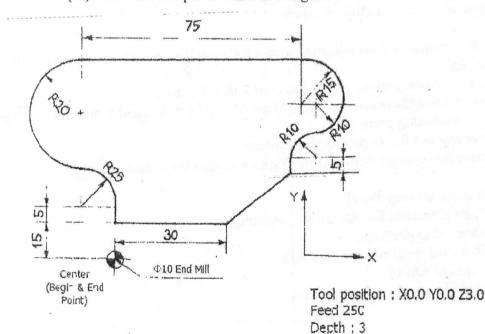
(c) Explain OPITZ classification system for part families.

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2. (a) Write a complete part program using G and M codes to machine the outline of the 10 geometry as shown in figure –

Assume - (i) Incremental positioning system.

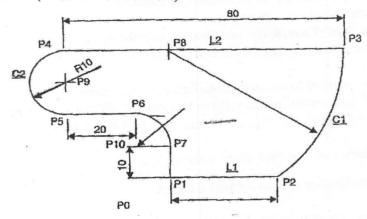
- (ii) Suitable tool and name it.
- (iii) Start and end point as shown in figure.



(b) Explain any one hidden line removal algorithm and explain how the algorithm determine 10 which entities are hidden.

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- 3. (a) Explain collaborative engineering.
  (b) Explain the CIM wheel in detail with respect to importance, functioning and features
  8
  - (c) Explain concept of Ray tracing. Give parametric vector representation of a Ray. 7
- 4. (a) Write a program in object oriented language for 3D geometric transformations which 10 include functions for the following operations:—
  - (i) Translation (ii) Rotation @ y axis (iii) Scaling.
  - (b) Write a complete APT program to machine the outline of the geometry as shown in 10 figure? (Assume suitable data).



- 5. (a) Explain machining centres and its types. State their specifications. 7
  (b) State the reasons which resulted in the development of graphic standards and describe 10
  - (b) State the reasons which resulted in the development of graphic standards and describe with neat sketch, the organization of typical CAP/CAM software. Also compare critically GKS and PHIGS graphic standards.
  - (c) Explain similarity coefficient matrix.
- 6. (a) Find the transformed coordinates when a square [(1, 1), (2, 1), (1, 2) and (2, 2)] is scaled for
  - (i) Uniform scaling with a factor of 2 in XY plane.
  - (ii) Non uniform scaling with a factor of 2 and 1.5 in X and Y directions, while anchoring point (1, 1)
  - (b) Explain any one Rapid prototyping process. 6
  - (c) List benefits of using Artificial intelligence in CAPP systems.
- 7. Write short notes on (any four):—
  - (a) Data structures for interactive modeling
  - (b) Green manufacturing
  - (c) Retrieval types process planning
  - (d) Types of AS/RS
  - (e) Coordinate measuring machine.