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Question Paper Code : 30928

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Sixth/Seventh Semester

Mechanical Engineering

ME 8691 — COMPUTER AIDED DESIGN AND MANUFACTURING

(Common to : Mechatronics Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define concurrent engineering?
2. What are the common features in CAD and CAM?
3. Give different types of representation of curves.
4. What are the different ways there in a CAD package to generate a cylindrical surface?
5. Why does graphics standard necessary in CAD/CAM systems?
6. List the uses of STL file format of a CAD model.
7. What is five-axis machine and why is it required in CNC machines?
8. Give any two benefits of a CAM package which is used in machining.
9. State cellular layout.
10. Differentiate between cellular manufacturing system and flexible manufacturing.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Define CAM process used in a typical CAD/CAM system. Explain with the help of a suitable example.

Or

- (b) Define and explain Bresenham's Line algorithm with an example.

12. (a) (i) Derive parametric equations of a quadratic B-Spline curve controlled by (3,2), (5,1), (4,6), and (7,2). (10)
- (ii) Find the tangent to the curve at $u = 0.2$ (3)

Or

- (b) Discuss in detail about the basic elements and building operations of the CSG Scheme required to create the component shown in the figure. Do not consider the dimensions of the component.

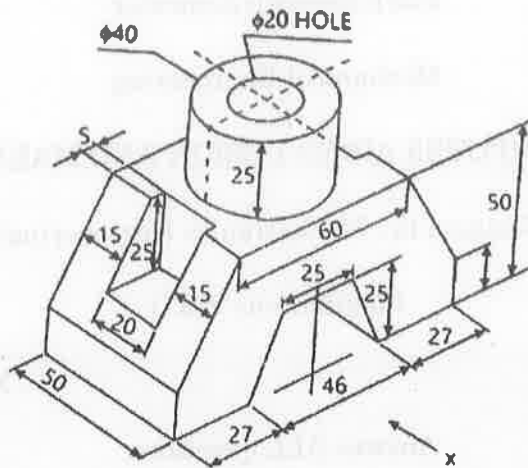


Fig. 12 (b)

13. (a) Define "Data exchange format" and explain with example how it is done.

Or

- (b) Explain the various functionalities and applications of 'Graphics Kernel System (GKS).
14. (a) Define Adaptive Control (AC) for NC/CNC machines and justify their uses in CNC systems giving its advantages.

Or

- (b) Explain the methods used by CNC machines for motion and position control with suitable sketches.
15. (a) Explain different approaches of group classification which help to switch over from a traditional production system to group technology system.

Or

- (b) What is flexible manufacturing system (FMS) layout? With suitable diagrams, explain different types of FMS layouts.

PART C — (1 × 15 = 15 marks)

16. (a) Write a CNC part program Fig. 16 (a) to machine the component along the boundary (3 mm width and 5 mm depth) of the component as shown in Figure 16 (a) using end milling cutter. Use the cutter compensation, incremental programming mode and metric units. Consider that the maximum depth of cut is 3 mm. With schematic diagram represent the parameters, tool path and motion commands required.

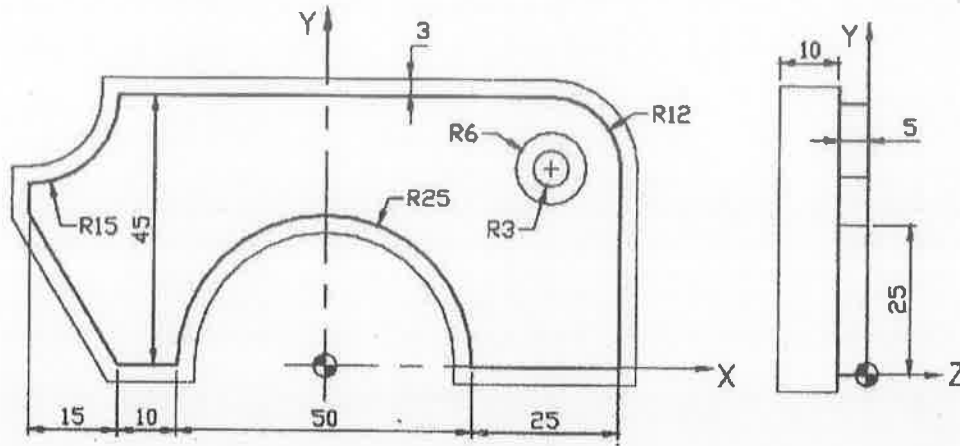


Fig. 16 (a)

Or

- (b) In order to manufacture a number of variants of piston for different automobiles, explain the types of machine tools that would be required to design a suitable manufacturing system. Assume suitable data wherever required.