2063
B. E. (Mechanical Engineering)
Fifth Semester
MEC-502: Computer Aided Design and Manufacturing (CAD/CAM)

Time allowed: 3 Hours   **Max. Marks: 50**

NOTE: *Attempt __five__ questions in all, including Question No. 1 (Section-I) which is compulsory and selecting two questions each from Section B- C.*

x-x-x

Section-A

1.
                                                                                        5x2
                                                                                        =10
a) A 2 degree B-spline curve has 6 control points. Find the continuity and no. of segments of the curve.

b) How tool can be changed in part program.

c) Write Hermite Matrix (M_H) for Hermite cubic splines.

d) Describe axis nomenclature for CNC lathe and milling machines.

e) Find the transformed coordinates when a line [(3, 4), (4, 2),] is rotated about z- axis by an angle of 90° in anticlockwise direction?

Section-B

2.
a) A Cubic Bezier curve is defined by control points (20, 20), (60, 80), (120, 100) and (150, 30). Find the equation of the curve and its midpoint coordinates.   7

b) Describe the advantage and disadvantages of soft automation?   3

3.
a) Find the new position of the pentagon [A(3, 2), B(5, 2), C(5, 3), D(4, 4), E(3, 5)] after its rotation by 90° anti-clockwise about A point and then reflection about a line passing through (5, 2) and parallel to y-axis ?   7

b) Write parametric and nonparametric equations of line and circle with example.   3

4.
a) Explain how the product cycle is revised with introduction of CAD/CAM.   4

b) What is Geometric Modeling. Discuss the need of Geometric modeling   3

c) Discuss the applications of CAD/CAM in automobile industry.   3

Section-C
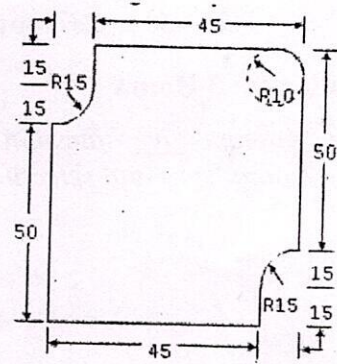
5.
a) Describe the basic elements of constructive solid geometry model. Discuss the CSG tree and data tables with examples.   7

b) Mention the need for surface modeling. Write the parametric equation of plane surface defined by points A, B and C.   3

6.   Write a complete part program to machine the outline of the geometry as shown in the diagram. The component is 4 mm thick. The milling tool used is 4 mm in diameter. Consider spindle speed as 850 rpm and feed as 130 mm/min. Assume suitable data if necessary.   10

7.
    a) Briefly explain the drilling canned cycle in manual part programming with suitable example.   4
    b) What are the various ways to specify a circle in APT. Explain with examples?   3
    c) What is the need of Euler's Formula in b-rep? Discuss Euler's Formula by taking suitable example.   3

x-x-x