

1129

**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. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Comment on the degree of B-Spline curve with 5 control points?
- b) What is the need of geometric modeling?
- c) Verify Euler's equation for a pentagonal pyramid.
- d) Write the parametric and non parametric representation of ellipse?
- e) What are the advantages of soft automation?
- f) Differentiate between M07 and M08 NC code.
- g) What is adaptive control?
- h) Write 2-d homogeneous shear transformation, matrix.
- i) Which G code is used to represent feed in mm/rev?
- j) Write the parametric equation of Bezier surface. (10x1)

UNIT - I

- II. Develop the equation of a Bezier curve, find the points on the curves for t=0.1, 0.3, 0.7 and 0.9 and plot the curve for the following data. The x, y coordinates of the four control points are given by :

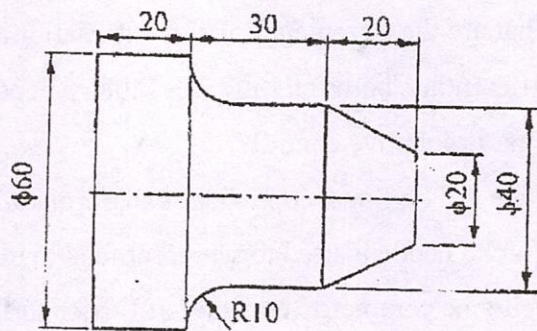
$$x = [1 \ 2 \ 4 \ 3]; \ y = [1 \ 1 \ 3 \ 1];$$
(10)
- III. Explain the role of CAD/CAM in designing and manufacturing new components in Modern Industries. (10)
- IV. Define the transformation matrix needed to reflect an object of rectangular shape about a line given by $y = x + 2$. The dimensions of the 2d object are [2, 2; 3, 2; 2, 3; 3, 3]. Determine and plot the final position of the Rectangular object. (10)

P.T.O.

(2)

UNIT - II

- V. a) Describe the complete process of building a solid model from the graphic primitives with suitable example.
 b) Explain the rotational and translational sweep techniques. (7,3)
- VI. a) What is adaptive type control system? Where it is recommended and what are the sources of variability in machining.
 b) Explain about the offset radius compensation in NC/CNC machines and corresponding G-codes. (6,4)
- VII. a) Write a manual part program for finishing a forged component as shown in the Figure. Assume the spindle speed and feed for machining as 500 rpm and 0.3 mm/rev respectively. Take suitable assumptions.



- b) Explain the use of subroutines in NC part programming with the help of a suitable example. (7,3)

x-x-x