

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. Make assumptions wherever you feel it necessary or in case of missing data.

x-x-x

Section A

Q1: Answer the following questions. (2 x 5= 10)

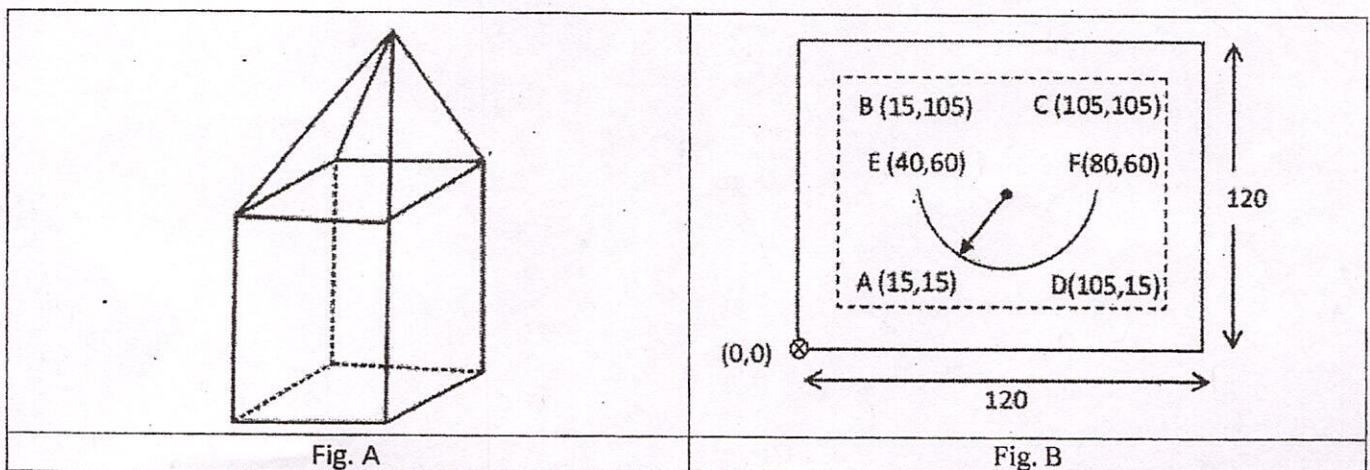
- (a) What are different types of automation? Briefly explain.
- (b) Define CAD, CAM and CIM.
- (c) Write down parametric equation of a (i) a line with start point (2,3,5) and end point (7,8,11) (ii) circle with center point as (2,3) and radius of 5.
- (d) Make a neat sketch to show coordinate axis of a CNC Vertical Milling Machine
- (e) Show with the help of a neat sketch generation of a cylindrical surface with circle swept along a line and an line swept along a circle.

Section B

- Q2: (a) What are different steps of a general design process? How do you apply computer systems in these steps? (5)
- (b) With the help of a suitable example, differentiate between the CSG, B-rep and Wire frame models. (5)
- Q3(a): Transform a triangle with corner points as A (3,4), B (7,5) and C (9,6) by rotating at an angle of 60 degree. The point A is to be used as the pivot point for rotation. Use homogenous transformation to first prepare a concatenated matrix. (7)
- (b) What are the differences in characteristics of the Hermite, Bezier and B-spline curves. (3)
- Q4: (a) Find equation of a Bezier curve drawn with the help of following control points A (2,3), B (5,4), C (8,3) and D (9,1). Also find out the points which divide the curve into four equal parts (7)
- (b) A curve is to be drawn with the help of 10 control points. Which curve do you suggest if degree of the curve is to be maintained at 3? Also find out the number of knot vectors, their values and parametric range of the curve. (3)

Section C

- Q5: (a) What are the different surface entities of the known form and free form? Briefly explain with the help of neat sketches. (5)
- (b) A line lying in XY plane with end points A (7,1) and B (2,8) is to be rotated about the Y axis. Find out equation of the revolved surface. (5)
- Q6 (a) Verify validity of the solid shown in figure A using Euler's formula (3)
- (b) Write down the part program for the part (Fig. B) to be made on CNC milling machine. The channel of 8 mm diameter, 5 mm deep along the rectangular path shown (ABCD). A circular channel with radius of 20 mm starting at pt. E ending at pt. F with 4 mm wide and 6 mm deep. Take stock size as 120 x 120 x 15 (mm). (7)



- Q7: With the help of suitable examples and sketches, explain the following (5 x 2).
- (c) Loops and subroutines
- (d) Computer aided part programming