Exam. Code: 0941
Sub. Code: 33863

2125

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-A) 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. Attempt the following:- (10x1)

(a) Write down names of steps of the general design process.

(b) Name different production types with their one-line explanation.

(c) Write any two major advantages of Bezier curve over Hermite curve?

(d) Make a sketch to show coordinate axis of a CNC Vertical Milling Machine.

(e) With a neat sketch, explain C1 continuity.

(f) Show with an example, APT statement for moving the tool from one point to another.

(g) What is half space in the context of CAD?

(h) What is a stereolithography file?

(i) What is DNC? Briefly explain in two lines.

(j) What PLM? Briefly explain in two lines.

Section B

Q2: (a) Explain with the help of neat sketches the concept of model, working and screen coordinate system. (6)

(b) Write down parametric equations of the following entities. (4)

- A line starting from point A (2,3) and ending at point B (10,11)
- A circle with center point (4,5) and radius of 4

Q3: (a) Transform a triangle with corner points as A (3,2), B (7,4) and C (4,8) by rotating by an angle of 60 degree anticlockwise. Point A is to be used as the pivot point for rotation. (7)

(b) A B-spline curve is to be drawn with the help of 10 control points and degree 3. Find out its parametric range and knot vectors. (3)

Q4: (a) Find equation of a Bezier curve drawn with the help of following control points A (2,3), B (5,4), C (7,3) and D (8,2). (6)

(b) Find out the points which divide the curve into four equal parts and tangent of the curve at its midpoint. (4)

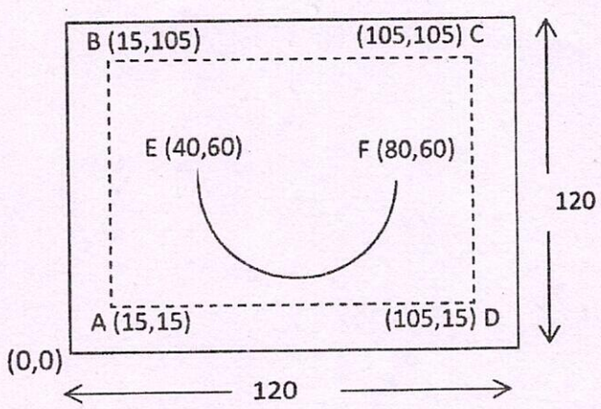
Section C

Q5: (a) A line lying in XY plane with end points A (8,2) and B (4,6) is to be rotated about the Y axis. Find out equation of the revolved surface. (5)

(b) With the help of a suitable example, differentiate between the CSG, B-rep and Wire frame models. (5)

Q6: (a) Write down the CNC part program for the part shown in the figure for CNC milling. The channel of 6 mm diameter, 4 mm deep along the rectangular path shown (ABCDA). A circular channel with radius of 20 mm starting at pt. E ending at pt. F with 5 mm wide and 2 mm deep. Take stock size as 120 x 120 x 10 (mm). (5)

(b) Explain with the help of a neat sketch, the concept of cutter radius compensation. (5)



Q7: With the help suitable examples and neat sketches, explain any two of the following. (5 x 2 =10)

(a) Principal of axis control in CNC

(b) Work zero and machine zero

(c) Euler's rule for checking validity of solids

x-x-x