

**END-SEMESTER EXAM (CAD-CAM-CIM) (PE 403)**

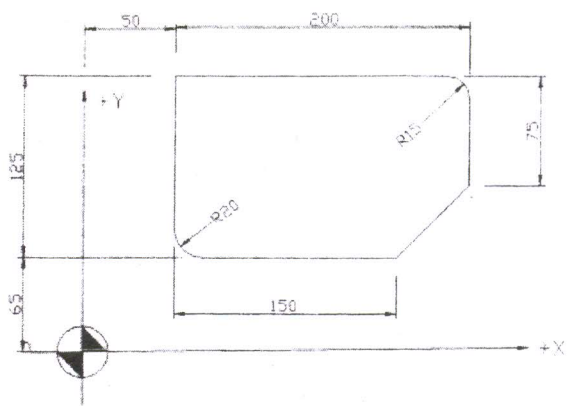
Programme: B.Tech. (Production)  
Duration: 3 Hrs.

Year: 2012 –13; Semester: I  
Max. Marks: 50

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat sketches wherever required.
4. Use of pocket calculators is allowed.
5. Assume suitable data if necessary.

Q. 1	A.	A square of 20 mm sides in XY plane having one edge inclined at 60° with X axis is rotated about Y axis by an angle 180° clockwise. Find the new co-ordinates of the square. Also prove that the same co-ordinates may also be obtained by reflection transformation about Y axis.	5
	B.	Write a manual part program using G codes and M codes for the turned component as shown in the drawing. Explain the meaning of each line in the programme. Assume the speed and feed on the turning centre as 400 rpm and 0.35 mm/rev.	5
		<p style="text-align: center;">All dimensions in mm</p>	
OR			
	C.	Justify the need of concatenated matrix with suitable example and explain the procedure of combining matrices to form concatenated matrix.	5
Q. 2	A.	Given four control points, A(3,2), B(5,11), C(8,8) and D(10,2). Find intermediate points on the Bezier curve for $u = 0.25, 0.5$ and $0.75$ .	5
		$= [U^3 \ U^2 \ U \ 1] \times \begin{bmatrix} -1 & 3 & -3 & 1 \\ 3 & -6 & 3 & 0 \\ -3 & 3 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} \times \begin{bmatrix} P_0 \\ P_1 \\ P_2 \\ P_3 \end{bmatrix}$	
	B.	Differentiate between Global control and Local control required to edit the curve. What are knot values in B-Spline Curves and how they affect the curve shape?	5
OR			
	C.	Explain different solid modeling techniques to develop a circular cylinder.	5

Q.3	<p>A. The component shown in figure is to be machined on a C.N.C. milling machine. Write a part program using manual part programming. The component is 15 mm thick, and a 10 mm end mill is to be used. The speed and feed are 700 rpm and 80 mm /min respectively. All dimensions are in mm. Explain the meaning of each command line in the programme.</p>																																																																																											
	<p>B. Explain the following terms:</p> <ul style="list-style-type: none"> <li>i. Tool length compensation</li> <li>ii. Cutter compensation</li> <li>iii. M01 and M03</li> </ul>	5																																																																																										
OR																																																																																												
	<p>C. Briefly discuss the following NC motion control systems:</p> <ul style="list-style-type: none"> <li>i. Point –to-point</li> <li>ii. Straight cut</li> <li>iii. Continuous Contouring</li> </ul>	5																																																																																										
Q. 4	<p>A. Apply the Rank order technique to the part machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically.</p> <table border="1" data-bbox="422 873 1250 1220"> <thead> <tr> <th rowspan="2">Machines ↓</th> <th colspan="10">Parts →</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>H</th> <th>I</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>1</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>1</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Machines ↓	Parts →										A	B	C	D	E	F	G	H	I	1	1		1	1	1			1	1	2				1						3	1		1		1			1	1	4		1								5		1		1						6						1	1			7	1									5
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	<p>B. Discuss how group technology is used in designing manufacturing cells. And explain the different criteria are used to design manufacturing cell with suitable examples.</p>	5																																																																																										
OR																																																																																												
	<p>C. What are the different types of data associated with FMS?</p>	5																																																																																										
Q. 5	<p>A. What are the major modules of a CAD based process planning software and the databases required?</p>	5																																																																																										
	<p>B. Explain the working principle of laser scanner used to scan the physical components.</p>	5																																																																																										
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	<p>C. Discuss the stages in the product life cycle and the importance of each stage.</p>	5																																																																																										