



# COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)  
SHIVAJI NAGAR, PUNE - 411 005

## END Semester Examination

### CAD/CAM/CIM TH

PE-14002

Course: B.Tech

Branch: Production Engineering (Sandwich)

Semester: Sem VII

Max.Marks:60

Year: 2014-2015

Date:24-11-2014

Duration: 3 Hours Time:- 2 pm to 5 pm

#### Instructions:

MIS No.

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1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q. 1	Solve Any Five:	
A.	A triangle ABC with vertices A(30,20), B(90,20) and C(30,80) is to be scaled uniformly by a factor of 0.5 about a point X(50,40). Determine: The concatenated transformation matrix and the co-ordinates of the vertices for a scaled triangle.	6
B.	The coordinates of two end points on a Cubic Spline are P0 = [5 10 20] and P1 = [35 50 40] and the value of corresponding tangent vectors are: Tangent Vector at P0 = [1 1 1] Tangent Vector at P1 = [4 5 6]. Estimate x,y,z coordinates of points on curve for u = 0.25, 0.5 and u=0.75. Given: $P(u) = \begin{bmatrix} u^3 & u^2 & u & 1 \end{bmatrix} \times \begin{bmatrix} 2 & -2 & 1 & 1 \\ -3 & 3 & -2 & -1 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} \times \begin{bmatrix} p_0 \\ p_1 \\ p'_0 \\ p'_1 \end{bmatrix}$	6
C.	Write a manual part program for turning a raw bar of $\phi$ 110 mm as per the drawing in given figure. Keep 0.2 mm to 0.5 mm material all over for finishing cut. All dimensions are in mm. Refer figure 1. Also write down the meaning of every instruction line.	6
	<p style="text-align: center;">Fig.1</p>	
D.	How do you represent a chair with four tapered legs, seat and backrest using CSG representation? Enumerate your answer with CSG tree and with a suitable sketch. Explain the Boolean operations carried out during the process.	6

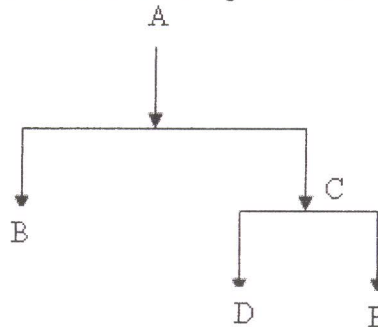
E. Apply the Rank order technique to the part machine incidence matrix in the following table to identify logical part families and machine groups. And name the part families after the analysis. Parts are identified by letters and machines are identified numerically. Also write down the name of part families generated after this analysis.

Parts	A	B	C	D	E	F	G	H	I	J
Machines										
M1	1		1	1	1			1	1	
M2				1						
M3	1		1		1			1	1	
M4		1								1
M5		1								
M6						1	1			1
M7	1									
M8										1

F. Consider the manufacture of a toy. The master production schedule to manufacture the toy is given in the following table:

Week	1	2	3	4	5	6	7	8
Demand	200	-	100	175	300	200	-	250

The bill of materials structure is given in the following figure:



**Bill of materials structure**

The details of Bill of Materials along with economic order quantity and stock on hand for the final product and subassemblies are shown in the following table.

Part Required	Order Quantity	No. of Units	Lead Time (Week)	Stock on Hand
A	350	1	2	200
B	450	1	1	400
C	400	1	1	375
D	375	1	1	250
E	400	1	2	425

Complete the material requirements plan for the main product A as well as for the subassemblies B, C, D and E.

Q.2	Solve any Four:	
A	Explain the importance of part slicing and its orientation with suitable example.	5
B	Differentiate between SLS and 3DP RP technique.	5
C	Describe the basic structure of Computer Aided Process planning software.	5
D	Define the term "Group Technology" and its importance in plant layout and manufacturing process planning.	5
E	What is boundary representation scheme and what are the basic primitives in this scheme. Also explain the formula used to validate b-rep model.	5
Q.3	Write a short notes on following (Any Two): i. Enterprise Resource Planning ii. Synthetic Surfaces iii. Optiz Classification System	10