

University of Mumbai
Examination First Half 2022
Program: **Mechanical Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: MEC702 and Course Name: CAD/CAM/CAE

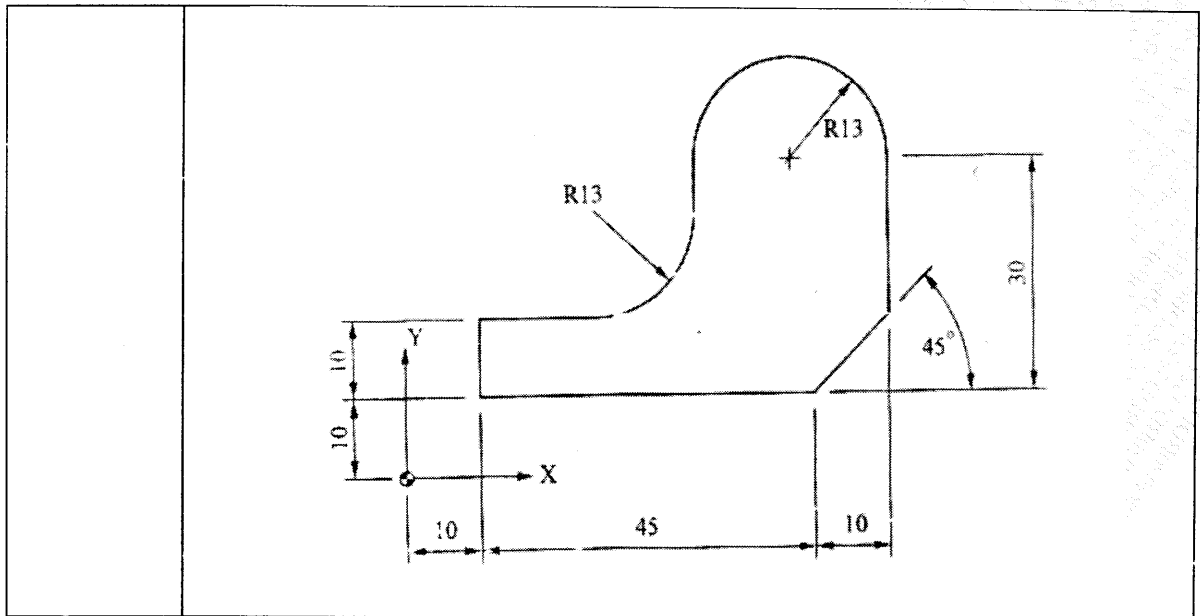
Time:

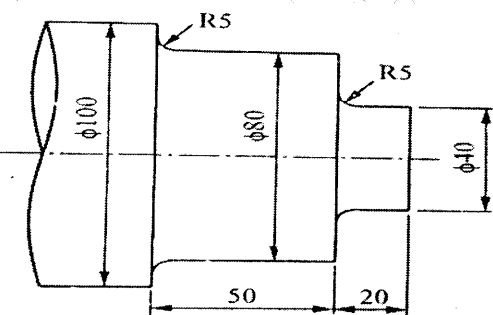
Max. Marks: 80

Q1.	Choose the correct option for the following questions. All the questions are compulsory and carry equal marks
1.	During the execution of a CNC part program block N020 G02 X45.0 Y25.0 R5.0 the type of tool motion will be
Option A:	Circular Interpolation - clockwise
Option B:	Circular Interpolation - counterclockwise
Option C:	Linear Interpolation
Option D:	Rapid feed
2.	What is the required file format for RP process
Option A:	.stl
Option B:	.slt
Option C:	.rpp
Option D:	.rpt
3.	In computer-aided drafting practice, an arc is defined by
Option A:	Two endpoints only
Option B:	Center and radius
Option C:	Radius and one endpoint
Option D:	Two endpoints and center
4.	P. M05 Q. G01 R. G04 S. G17 1. Spindle stop 2. Dwell 3. XY Plane selection 4. Linear interpolation (Match the above in pairs)
Option A:	P-2, Q-3, R-4, S-1
Option B:	P-3, Q-4, R-1, S-2
Option C:	P-1, Q-4, R-2, S-3
Option D:	P-4, Q-3, R-2, S-1
5.	In a point-to-point type of NC system
Option A:	Control of position and velocity of the tool is essential
Option B:	Control of only the position of the tool is sufficient
Option C:	Control of only the velocity of the tool is sufficient
Option D:	Neither position nor velocity needs to be controlled
6.	In the following geometric modeling techniques, which technique cannot be used for finite element analysis
Option A:	Wireframe modeling
Option B:	Surface modeling
Option C:	Solid modeling

Option D:	None of the options
7.	Which one of the RP processes are not using a laser?
Option A:	SLA
Option B:	LOM
Option C:	FDM
Option D:	SLS
8.	In the following geometric primitives, which is not a solid entity of CSG modeling?
Option A:	Box
Option B:	Cone
Option C:	Cylinder
Option D:	Circle
9.	Lower demand for traditional skill sets is which aspect of CIM?
Option A:	Social
Option B:	Ethical
Option C:	Traditional
Option D:	Geographical
10.	The shape of the Bezier curve is controlled by
Option A:	Control points
Option B:	Knots
Option C:	Endpoints only
Option D:	All the above

Q2. (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	A cubic Bezier curve is defined by the control points as (1,1,0); (2,3,0); (4,4,0) & (6,1,0). Find the equation of the curve in parametric form and plot the curve with min five points.
B	Find transformation matrix A_v which aligns vector $V = ai+bj+cK$ with vector 'k' along the positive direction of z-axis. Explain all steps clearly.
C	Assume the raw material, calculate the required process parameters and write a manual part program using G and M codes for the finished part below. All dimensions are in mm.



Q3. (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	<p>Write a Manual Part program for machining the component as shown in the figure. Use roughing and finishing cycles for part programming. Assume spindle speed as 200 rpm and feed rate as 0.5 mm/ rev. All dimensions are in mm.</p> 
B	Explain the overall process of rapid prototyping and write a detailed note on Laminated object manufacturing (LOM) with a diagram and state its applications.
C	What is the Scope and Role of CAD/CAM in CIM?

Q4. (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	Explain Stereo-lithography Approach (SLA) with its advantages, disadvantages, and applications.
B	Explain Polygon Clipping (Sutherland–Hodgman) Algorithm
C	Triangle ABC has vertices A (2,4), B (4,6), and C (2,6). It is to be reflected about line $4Y=2X+8$. Determine the new coordinates of the reflected triangle.