



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
(Common to ME & MCT)
(Model Question Paper)

MR-21

Course Title: CAD/CAM
Time: 3 hours

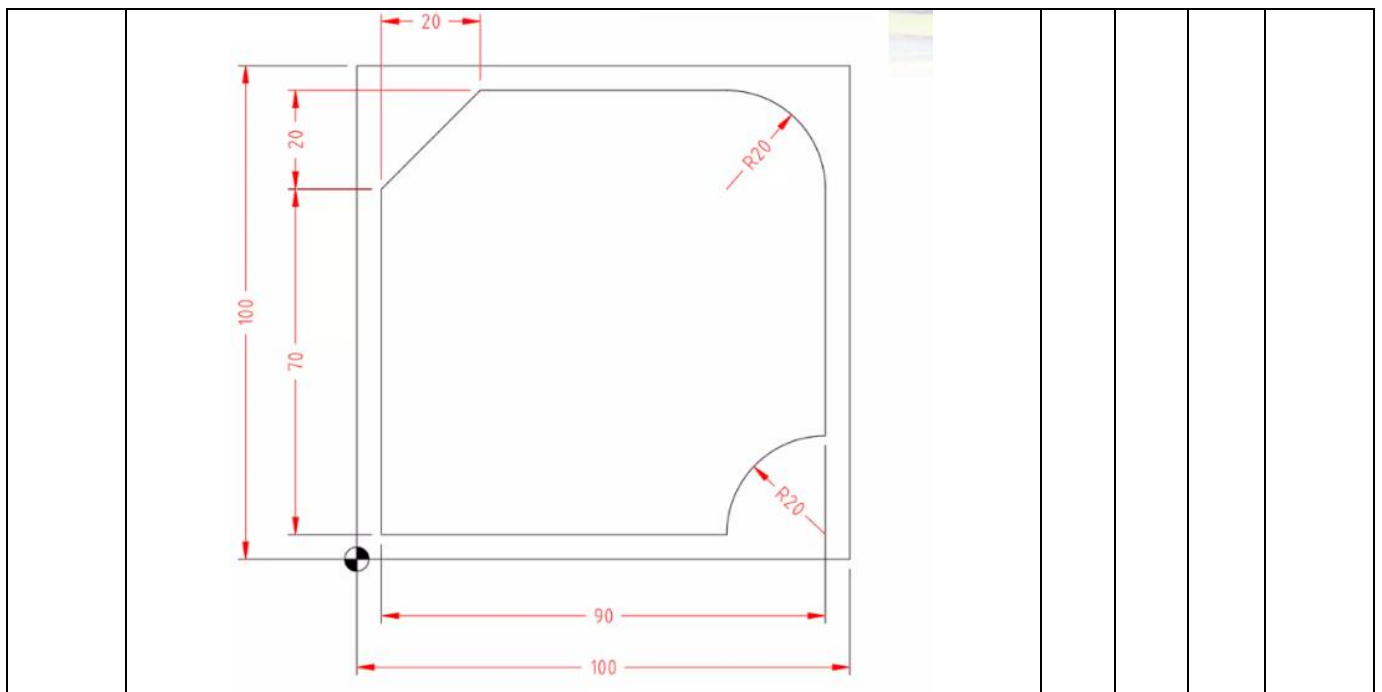
Course Code: ME 701PC
Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	List the four types of production systems with one example for each type.	2	1	1	1
1. b)	List the advantages of Computer Aided Design	2	1	1	1
Unit-II					
1. c)	Outline the blending function used in wire-frame modeling?	2	1	2	5
1. d)	State the convex hull property in Bezier surface?	2	1	2	5
Unit-III					
1. e)	Explain MACROS used in APT Part Program.	2	1	3	5
1. f)	What are the elements of NC system?	2	1	3	1
Unit-IV					
1. g)	Define the term "Group Technology" and its importance in plant layout and manufacturing process planning.	2	1	4	5
1. h)	State the term Production Flow Analysis and list it's output.	2	1	4	5
Unit-V					
1. i)	List the benefits of CIM?	2	1	5	1
1. j)	Discuss the advantages of non-contact inspection techniques.	2	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	List out various reasons for implementing a CAD/CAM in Production system	5	1	1	1
2. b)	Briefly describe the types of storage devices used in CAD/CAM.	5	2	1	1
OR					
2. c)	Explain product life cycle by implementing CAD/ CAM.	5	1	1	5
2. d)	List various display devices that are used for displaying information? Present their merits and demerits	5	2	1	1
Unit-II					
3. a)	State the parametric representation and non-parametric representations of any 5 analytical geometric wire-frame entities.	5	3	2	5
3. b)	Draw and explain various types of surface entities used in CAD/CAM?	5	4	2	1
OR					
3. c)	Explain the basic curve fitting techniques used in CAD	5	3	2	2
3. d)	Describe various commonly used primitives for solid modeling and explain the Boolean operations.	5	4	2	2
Unit-III					
4. a)	Explain the preparatory functions used in NC part programming for given Fig 1 below	5	4	3	1



4. b)	Break down the classification of the NC machines.	5	4	3	1
OR					
4. c)	With neat sketches, write down the neat procedure for developing a manual part program.	5	4	3	4
4. d)	Develop any 10 G-codes and 10 M-codes with a short description.	5	4	3	1
Unit-IV					
5. a)	Explain the MICLASS coding system used in group technology	5	2	4	5
5. b)	Explain following inspection systems: a) On-line inspection b) Off-line inspection	5	2	4	5
OR					
5. c)	Develop the Opitz code for any suitable example.	5	5	4	4
5. d)	Analyze the application and advantages of integration of CAQC	5	4	4	1,5
Unit-V					
6. a)	Explain with the aid of a block diagram the “concept of CIM”	5	2	5	5
6. b)	Explain the applications of Computer Integrated Manufacturing systems.	5	2	5	5
OR					
6. c)	Does CIM required for Indian industry? Discuss various issues of implementations, challenges in CIM.	5	4	5	5,12
6. d)	Summarize various types of Material handling systems used in automation.	5	6	5	1,5,12

M: Marks; L: Bloom’s Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



Course Title: Automobile Engineering

Time: 3 hours

Course Code: MT701PC

Max. Marks: 70

*Note: Answer ALL Questions**Part-A (10 x 2 = 20 Marks)*

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Mention few drawbacks of simple carburettor.	2	1	1	1
1. b)	What are the types of Lubrication system?	2	3	1	1
Unit-II					
1. c)	Enlist the functions of Ignition systems	2	2	2	4
1. d)	Discuss the cooling system Requirements	2	3	2	4
Unit-III					
1. e)	What are the different types of tyres used in automobile?	2	2	3	1
1. f)	What are Advantages of single plate Clutch?	2	2	3	1
Unit-IV					
1. g)	Define toe-in and toe-out	2	4	4	4
1. h)	Briefly discuss the functional requirements of braking fluids.	2	1	4	4
Unit-V					
1. i)	Enlist List the advantages of hydrogen fuel	2	1	5	5
1. j)	Explain the types of Pollution standards and its importance	2	2	5	5

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	What are the major components of an automobile? Explain in detail	5	2	1	1
2. b)	Describe the simple carburettor with a neat sketch	5	3	1	1
OR					
2. c)	How does the electrical fuel pump works in spark ignition engine? Describe with a simple diagram.	5	3	1	1
2. d)	Explain the C.I Engine Fuel supply system in detail	5	2	1	1
Unit-II					
3. a)	Differentiate between air cooling system and water cooling system in automobiles along with their applications.	5	4	2	1
3. b)	Explain about a) Thermostat b) radiator	5	1	2	1
OR					
3. c)	Describe the constructional and operational features of battery ignition system used in automobile engine	5	2	2	2
3. d)	What are advantages of Electronic ignition system Comparing with Conventional ignition system?	5	2	2	2
Unit-III					
4. a)	Write about single plate clutch and multi plate clutch in detail?	5	1	3	4
4. b)	Explain the construction working and performance of a fluid flywheel. Enumerate the advantages of fluid flywheel over the other types of clutches	5	1	3	4
OR					
4. c)	Write about functions of a propeller shaft and Hotch – Kiss drive?	5	2	3	4
4. d)	What are types of suspension systems? Compare the suspension systems with merits and demerits	5	3	3	4
Unit-IV					

5. a)	What are camber and castor angles, what are its significance in steering geometry.	5	2	4	2
5. b)	Explain the ackerman of steering gear system	5	1	4	3
OR					
5. c)	What are the types of brakes and explain functions of braking system	5	1	4	5
5. d)	How to incorporate tandem master cylinder in braking system of an automobiles? Explain its significance	5	5	4	5
Unit-V					
6. a)	Explain the international standards followed for the automobile pollutants? Explain how these standards are maintained.	5	2	5	5
6. b)	Explain in detail about of engine emissions and emission standards.	5	1	5	5
OR					
6. c)	What are the merits and demerits for the engine if LPG and CNG as alternate fuels? Discuss.	5	2	5	7
6. d)	Compare the electric vehicle with hybrid vehicle with its advantages	5	3	5	7

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
(Common to ME & MCT)
(Model Question Paper)

MR-21

Course Title: Automation in Manufacturing
Time: 3 hours

Course Code: ME713PE
Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define Automation.	2	1	1	1
1. b)	List the levels of automation	2	1	1	1
Unit-II					
1. c)	What are the advantages of continuous transfer system	2	1	2	2
1. d)	Write the components are included in assembly flow line	2	2	2	2
Unit-III					
1. e)	Define precedence diagram	2	1	3	3
1. f)	What is perfect balance in line balancing	2	2	3	3
Unit-IV					
1. g)	What is material handling system	2	1	4	1
1. h)	What is AS/RS system	2	1	4	10
Unit-V					
1. i)	Define business process reengineering	2	1	5	3
1. j)	Write about actuator	2	2	5	1

Part-B (5 x 10 = 50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain programmable Automation with suitable examples	5	2	1	1
2. b)	Write any five applications of automation	5	2	1	1
OR					
2. c)	Explain term facilities in production system	5	1	1	3
2. d)	Discuss on mechanization	5	2	1	1
Unit-II					
3. a)	Explain the various aspects considered for implementation of automated flow lines	5	3	2	4
3. b)	Describe on control function in automated flow lines	5	3	2	4
OR					
3. c)	Discuss on partial automation	5	2	2	1
3. d)	Find out the usage of buffer storage in flow lines	5	1	2	2
Unit-III					
4. a)	Describe mechanical fastening in assembly process	5	3	3	5
4. b)	List out types of assembly systems and explain any one of it.	5	2	3	5
OR					
4. c)	What are the line balancing methods and mention procedure for one method	5	2	3	3
4. d)	Explain terms (i) Total work content (ii) Cycle time	5	3	3	3
Unit-IV					
5. a)	Explain the principles of Material handling system	5	2	4	5
5. b)	Discuss on two material handling system	5	2	4	5
OR					
5. c)	List out the functions of Material handling system	5	2	4	10
5. d)	Differentiate between Fixed Aisle AS/RS and Carousel storage system	5	3	4	10

P.T.O.

Unit-V					
6. a)	Explain BPE logistics	5	2	5	5
6. b)	Differentiate between open loop and closed loop control system	5	3	5	5
OR					
6. c)	Explain any two sensors	5	3	5	6
6. d)	Discuss features of actuators	5	2	5	7

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



Course Title: Operations Research

Time: 3 hours

Course Code: MT715PE

Max. Marks : 70

Note: Answer ALL Questions

Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define Operations Research	2	1	1	1
1. b)	Explain the significance of slack and surplus variables.	2	2	1	1
Unit-II					
1. c)	What is a degenerate transportation problem and how do you resolve it?	2	1	2	2
1. d)	What is an assignment problem? Give two areas of its applications.	2	1	2	2
Unit-III					
1. e)	What are the assumptions made in the sequencing problem?	2	1	3	1
1. f)	Explain group replacement concept and its applications.	2	2	3	2
Unit-IV					
1. g)	Explain the 'minimax and maximin criterion in game theory.	2	2	4	1
1. h)	Define inventory. What are the different types cost associated with inventory?	2	1	4	2
Unit-V					
1. i)	Describe the various elements of the queue.	2	2	5	3
1. j)	State and explain 'Bellman's principle of optimality'.	2	2	5	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	What are the phases in Operations Research? Explain briefly.	4	1	1	1
2. b)	Solve the following linear programming problem using graphical method. Maximize $Z = 40x_1 + 100x_2$ Subject to $12x_1 + 6x_2 \leq 3000$ $4x_1 + 10x_2 \leq 2000$ $2x_1 + 3x_2 \leq 900$ and $x_1, x_2 \geq 0$	6	3	1	2
OR					
2. c)	Use simplex method to solve the following Linear Programming Problem. Maximize $Z = 5x_1 + 4x_2$ Subject to $4x_1 + 5x_2 \leq 10$ $3x_1 + 2x_2 \leq 9$ $8x_1 + 3x_2 \leq 12$ and $x_1, x_2 \geq 0$	10	2	1	3
Unit-II					

3. a)	A steel company has three open-hearth furnaces and four rolling mills. The transportation cost (Rs. per quintal) for shipping steel from furnaces to rolling mills is shown in the following table. Determine the optimal basic feasible solution by Vogel's Approximation method.					10	5	2	3	
		M1	M2	M3	M4					Capacity (in quintals)
	F1	2	3	11	7					6
	F2	1	0	6	1					1
	F3	5	8	15	9					10
Requirement (in quintals)	7	5	3	2						

OR

3. c)	Consider the problem of assigning five jobs to five persons. The assignment costs are given below. Find the optimum assignment schedule.						10	1	2	4
		Job								
		1	2	3	4	5				
	A	8	4	2	6	1				
	B	0	9	5	5	4				
	C	3	8	9	2	6				
D	4	3	1	0	3					
E	9	5	8	9	5					

Unit-III

4. a)	When can we apply Johnson's algorithm in finding the optimal ordering of n jobs through 3 machines?	4	2	3	3																
4. b)	There are seven jobs, each of which has to go through the machines M1 and M2 in the order M1M2. Processing times in hours are given below:	6	4	3	5																
	<table border="1"> <tr> <td>Job</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> </tr> <tr> <td>Machine 1</td> <td>1</td> <td>4</td> <td>6</td> <td>3</td> <td>5</td> <td>2</td> </tr> <tr> <td>Machine 2</td> <td>3</td> <td>6</td> <td>8</td> <td>8</td> <td>1</td> <td>5</td> </tr> </table>					Job	A	B	C	D	E	F	Machine 1	1	4	6	3	5	2	Machine 2	3
Job	A	B	C	D	E	F															
Machine 1	1	4	6	3	5	2															
Machine 2	3	6	8	8	1	5															
	Determine a sequence of these jobs that will minimize the total elapsed time T. Also find idle time for machines A and B.																				

OR

4. c)	What do you mean by replacement policy? Write a note on group replacement	4	1	3	3													
4. d)	A firm is thinking of replacing a particular machine whose cost price is Rs.1600. The scrap price of this machine is Rs.1100. The maintenance costs are found to be as follows:	6	3	3	4													
	<table border="1"> <tr> <td>Year</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Maintenance cost</td> <td>300</td> <td>450</td> <td>600</td> <td>800</td> <td>1000</td> <td>1200</td> <td>1500</td> <td>2000</td> </tr> </table>					Year	1	2	3	4	5	6	7	8	Maintenance cost	300	450	600
Year	1	2	3	4	5	6	7	8										
Maintenance cost	300	450	600	800	1000	1200	1500	2000										
	At what age the machine should be replaced?																	

Unit-IV

5. a)	Analyse the game and find the value of the game.	10	2	4	2			
	Player A					B1	B2	B3
	A1					80	70	60
A2	90	80	100					
A3	40	30	40					
OR								
5. c)	Derive Harris-Wilson formula for EOQ with usual notations.	4	2	4	3			
5. d)	From the following data obtained in respect of an item of store, find the economic order quantity and total inventory managing cost annually.	6	1	4	4			
	Total annual consumption = 1200 units							
	Cost per unit = Rs.2.00							
	Ordering cost per order = Rs.80							
Cost of carrying inventory = 20% per annum								
Unit-V								
6. a)	Arrival rate of telephone calls at a telephone calls at a telephone booth are according to Poisson's distribution with an average time of 9 minutes between two consecutive arrivals. The length of telephone call is assumed to be exponentially distributed with mean 3 minutes.	10	2	5	3			
	i) Find the average queue length							
	ii) Determine the probability that a person arriving at the booth will have to wait.							
OR								
6. c)	Use dynamic programming to solve the following Linear Programming Problem:	10	3	5	12			
	Maximize $Z = 8x_1 + 7x_2$							
	Subject to $2x_1 + x_2 \leq 8$							
	$5x_1 + 2x_2 \leq 15$							
and $x_1, x_2 \geq 0$								

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
(Mechanical Engineering (Mechatronics))
(Model Question Paper)

MR-21

Course Title: Light Metal Technology
Time: 3 hours

Course Code: MM721OE
Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	What are light metals	2	2	1	1,2
1. b)	Explain about Strengthening by grain refinement	2	1	1	1,2
Unit-II					
1. c)	Classify Aluminium alloys	2	2	1	1,2
1. d)	Write four applications of Aluminium alloys	2	1	1	1,2
Unit-III					
1. e)	Describe powder metallurgy	2	2	2	1,2
1. f)	Write about different processing routes of Aluminium Alloys	2	1	2	1,2
Unit-IV					
1. g)	What are the roles of Al and V in Ti alloys	2	3	3	1,2
1. h)	Classify Ti alloys	2	3	3	1,2
Unit-V					
1. i)	Short notes on Mg alloys	2	3	4	1,2
1. j)	What are the applications of Be alloys	2	2	4	1,2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Describe the solid solution strengthening mechanisms in metals and alloys with suitable figures	5	3	1	1,2
2. b)	What are the major applications of light metals and alloys explain with case studies	5	2	1	1,2
OR					
2. c)	Describe the dispersion strengthening mechanisms in metals and alloys with suitable figures	5	2	1	1,2
2. d)	Describe the strengthening mechanisms by work hardening in metals and alloys with suitable figures	5	3	1	1,2
Unit-II					
3. a)	Write about the Al-Si alloys composition, heat treatment and applications	5	4	1	1,2
3. b)	Compare heat treatable and non heat treatable Al alloys	5	2	1	1,2
OR					
3. c)	Describe one Al-Zn and Al-Mn alloy by giving their composition, heat treatment and applications	5	4	2	1,2
3. d)	Explain in detail Al-Cu alloy ageing behaviour with the help of phase diagram	5	4	2	1,2
Unit-III					
4. a)	What is rapid solidification and how it is different from conventional solidification techniques	5	1	2	1,2
4. b)	Explain atomisation of powders with suitable figures	5	4	2	1,2
OR					
4. c)	Discuss about the 2 high strength Al alloys in detail by their composition, processing and applications	5	4	2	1,2

P.T.O.

4. d)	What are different processing techniques used in manufacturing Al alloys and describe about any two in detail	5	4	2	1,2
Unit-IV					
5. a)	Classify Ti alloys and properties and applications and commercially pure Ti alloys	5	2	3	1,2
5. b)	Heat treatment, Properties and applications of Ti-6Al-4V alloy with suitable figures	5	2	3	1,2
OR					
5. c)	How do you process Ti alloys and what are they, explain about one processing technique in detail	5	3	3	1,2
5. d)	Heat treatment, Properties and applications of Ti-8Al-1Mo-1V Ti-5553 alloys;	5	1	3	1,2
Unit-V					
6. a)	Write about Beryllium alloys Classification properties and applications	5	3	4	1,2
6. b)	Write about Corrosion resistance of Mg-alloys	5	2	4	1,2
OR					
6. c)	Write important applications and properties of Mg-Sn, Mg-Zn alloys	5	2	4	1,2
6. d)	Write important applications and properties of Mg-Gd, Mg-Li systems	5	1	4	1,2

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