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   **Course Code: ME 701PC**

Time: 3 hours   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				

		M	L	CO	PO
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

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

Course Title: Refrigeration & Air Conditioning   **Course Code: ME702PC**
Time: 3 hours   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)	Illustrates the necessity and application of refrigeration systems?	2	2	1	1,2
1. b)	Why Co-efficient Of Performance is greater than 1?	2	6	1	1,2
	Unit-II				
1. c)	List the different types of vapour compression refrigeration systems to improving the COP of simple cycle.	2	2	2	1,2
1. d)	Distinguish between dry and wet compression.	2	2	2	1,2
	Unit-III				
1. e)	State the desirable properties of ideal refrigerants.	2	2	3	1,2
1. f)	State the classification of condenser used in refrigeration system?	2	2	3	1,2
	Unit-IV				
1. g)	Write the advantages of vapour absorption refrigeration system.	2	3	4	1,2
1. h)	What is the function of an absorber in vapour absorption system?	2	2	4	1,2
	Unit-V				
1. i)	What factors affect effective temperature?	2	2	5	1,2
1. j)	List out the various psychrometric properties of air.	2	2	5	1,2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Derive the expression for air refrigeration system working on Bell-Coleman cycle.	5	4	1	1,2,3
2. b)	An air craft moving with speed of 1000 km/h uses simple gas refrigeration cycle for air conditioning. The ambient pressure and temperature are 0.35 bar and -10^{0}C respectively. The pressure ratio of compressor is 4.5. The heat exchanger effectiveness is 0.95. The isentropic efficiencies of compressor and expander are 0.8 each. The cabin pressure and temperature are 1.06 bar and 25^{0}C. Determine temperature and pressures at all points of the cycle. Also find the volume flow rate through compressor inlet and expander outlet for 100 TR. Take CP=1.005 kJ/kg K; R=0.287 kJ/kg K and CP/CV=1.4 for air.	5	5	1	1,2,3
	OR				
2. c)	Refrigerator working on Bell-Coleman cycle operates between pressure limits of 1.05 bar and 8.5 bar. Air is drawn from the cold chamber at 10 ^{0}C, compressed and, then it is cooled to 30^{0}C before entering the expansion cylinder. The expansion and compression follows the law $PV^{1.3}$ = Constant. Determine the theoretical C.O.P of the system?	5	5	1	1,2
2. d)	Explain the working principle of Regenerative air refrigeration system with the help of configuration diagram and temperature-entropy diagram.	5	4	1	1,2
	Unit-II				
3. a)	Explain the different methods of improving the COP of simple vapour compression refrigeration cycle.	5	4	2	1,2
3. b)	A simple saturation cycle using F12 is designed for taking a load of	5	5	2	1,2

	10 tons. The refrigerator and ambient temperatures are -10^{0}C and 30^{0}C respectively. A minimum temperature difference of 5^{0}C is required in evaporator and condenser for heat transfer. Find: i) mass flow rate through the system, ii) power required in kw. iii) Cylinder dimensions assuming L/D = 1.2 for single cylinder, single acting compressor if it runs at 300 r.p.m. with volumetric efficiency = 0.9.				
OR					
3. c)	A vapour compression refrigerator uses R-12 as refrigerant and the liquid evaporates in the evaporator at -15^{0}C. The temperature of this refrigerant at the delivery from the compressor is 15^{0}C when the vapour is condensed at 10^{0}C. Find the coefficient of performance if the liquid is cooled by 5^{0}C before expansion by throttling. Take specific heat at constant pressure for the superheated vapour as 0.64kJ/kg K and that for liquid as 0.94 kJ/kg K. the other properties of refrigerant are as follows: Temp oC / Sp. enthalpy (Liq, vap) / Sp. entropy (liq, vap): -15: 22.3, 180.88, 0.0904, 0.7051 10: 45.4, 191.76, 0.1750, 0.6921	5	4	2	1,2,7
3. d)	The temperature limits of an ammonia refrigerating system operating on simple vapor compression cycle are 25^{0}C and -10^{0}C respectively. If the gas is dry at the end of compression, calculate the C.O.P of the system, assuming no under cooling of the liquid ammonia. Use the following table for the properties of ammonia. Temp oC / Liquid heat (Kj/kg) / Latent heat (Kj/kg) / Liquid entropy (Kj/KgK): 25: 298.9, 1166.94, 1.1242 -10: 135.37, 1297.58, 0.5443	5	5	2	1,2,6
Unit-III					
4. a)	Explain working principle of evaporative condenser with neat sketch?	5	2	3	1,2
4. b)	What is an azeotrope? Give some examples to indicate its importance.	5	2	3	1,2
OR					
4. c)	Explain working principle of thermostatic expansion valve with neat sketch?	5	2	3	1,2
4. d)	Mention the chemical formula and the refrigerant number of following refrigerants: (i) Dichloro difluoro methane, (ii) Dichloro tetrafluoro ethane, (iii) propylene, (iv) ethlylene and (v) sulphur dioxide.	5	2	3	1,2
Unit-IV					
5. a)	Explain the working principle and operation of thermoelectric refrigerator.	5	2	4	1,2
5. b)	With a neat sketch explain the working principle of a three fluid vapour absorption refrigeration system.	5	2	4	1,2
OR					
5. c)	With a neat sketch explain the working principle of Li Br-water absorption refrigeration system.	5	2	4	1,2
5. d)	Describe the working principle and basic components steam jet refrigeration system.	5	2	4	1,2

	Unit-V				
6. a)	Draw a labeled sketch and explain working of window air conditioning system?	5	2	5	1,2
6. b)	Calculate the following when the DBT is 35 ^{0}C, WBT is 23 ^{0}C and the barometer reads 750 mm Hg: (i) Relative humidity ii) Humidity ratio iii) DPT iv) Density (v) Enthalpy of atmospheric air.	5	4	5	1,2
	OR				
6. c)	What is comfort air-conditioning? Draw a rough comfort chart.	5	2	5	1,2
6. d)	A small office hall of 25 persons capacity is provided with summer air conditioning system with the following data: Outside conditions = 34^{0}C DBT and 28^{0}C WBT, inside conditions = 24^{0}C DBT and 50 % RH, volume of air supplied = 0.4 m3/min/person, sensible heat load in room = 125600 kJ/hr, latent heat load in the room = 42000 kJ/hr. Find the sensible heat factor of the plant.	5	4	5	1,2

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

MR-21

Course Title: Automation in Manufacturing　　　　　**Course Code: ME713PE**

Time: 3 hours　　　　　　　　　　　　　　　　　　　　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

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	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

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Course Title: **Additive Manufacturing Technology**   Course Code: **ME717PE**
Time: 3 hours   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)	Differentiate between additive and subtractive processes.	2	2	1	1,2
1. b)	What are the commonly used terms of AM Technologies.	2	1	1	1
Unit-II					
1. c)	What are the applications of photopolymerization process?	2	1	2	1,5
1. d)	What are different types of materials available for the FDM system?	2	1	2	1,5
Unit-III					
1. e)	Mention the products that can be manufactured using 3D Printing.	2	1	3	2,5
1. f)	What is meant by direct metal tooling?	2	1	3	3,5
UNIT-IV					
1. g)	What are abbreviations of STL File format?	2	1	4	5
1. h)	Mention few translators available for conversions of STL files.	2	1	4	5,6
UNIT-V					
1. i)	List out few bio-engineering applications in AM.	2	1	5	1,12
1. j)	How AM is used in GIS application.	2	2	5	6

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Describe the historical development of RP and related technologies with a line diagram.	5	1	1	1,5
2. b)	What is Additive manufacturing? Classify them based on the material used.	5	3	1	1,5
OR					
2. c)	Categorize the applications of AM in manufacturing industries and also compare rapid prototype technology with computer numerical control technology.	5	3	1	1,5
2. d)	Discuss the steps involved in Additive manufacturing process chain with a flow chart.	5	4	1	1,2,5
Unit-II					
3. a)	Explain the working principle of Stereolithography with a neat sketch. What are the different models available.	5	2	2	2,3
3. b)	With neat sketches explain solid ground curing process and its advantages. What are the disadvantages and applications of SGC system?	5	2	2	2,3
OR					
3. c)	Explain in detail about laminated object manufacturing (LOM) and its applications.	5	2	2	2,3
3. d)	Explain the working principle of Fused Deposition Modelling (FDM).	5	2	2	2,3
Unit-III					
4. a)	Explain how SLS process can be used to produce direct and in-direct prototypes.	5	2	3	3, 5
4. b)	What is rapid tooling and explain the applications of RPT in manufacturing and tooling.	5	1	3	3, 5
OR					

		M	L	CO	PO
4. c)	Write short notes on: (i) Spray metal tooling & Investment casting tooling.	5	1	3	4,5
4. d)	Explain the direct Rapid tooling methods for manufacturing tools in 3DP?	5	2	3	5
Unit-IV					
5. a)	Explain the process of conversion of STL from CAD Model.	5	2	4	4,5
5. b)	Explain about data formats and data interfacing.	5	2	4	5
OR					
5. c)	Explain about STL file repairs in detail with examples.	5	1	4	5
5. d)	Write the features of AM software: (i) Magics (ii) Mimics (iii) Velocity 2.	5	2	4	5
Unit-V					
6. a)	What are the typical AM applications in engineering and analysis? Briefly describe each of them and illustrate them with examples.	5	3	5	5
6. b)	Why and in what circumstances would AM be considered to assist implant fabrication.	5	4	5	3,4
OR					
6. c)	Explain how AM systems can be applied to traditional industries like the jewellery, coin and tableware industries.	5	3	5	4
6. d)	Describe how AM models can be used for pre-surgical operation planning. Use appropriate examples to illustrate your answer.	5	4	5	4

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. VII Semester End Examinations
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| MR-21 |

Course Title: Electrical Systems and Safety **Course Code: EE722OE**
Time: 3 hours 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 the different types of cables?	2	4	1	1
1. b)	What are the IE rules for domestic wiring?	2	5	1	1
	Unit-II				
1. c)	What are the advantages of earthing?	2	2	2	2
1. d)	Give two examples for electrical Hazards?	2	3	2	2
	Unit-III				
1. e)	Where are the parts of substation?	2	1	3	1
1. f)	What is the purpose of circuit breaker?	2	1	3	2
	Unit-IV				
1. g)	What is tariff?	2	1	4	2
1. h)	What are the types of Tariff?	2	1	4	2
	Unit-V				
1. i)	Define the term Solid angle and give its formula?	2	2	5	3
1. j)	Define the term illumination and give its formula?	2	2	5	3

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	What are the Types of wires, specifications, types of wiring systems and explain them with neat diagram?	5	1	1	1
2. b)	Explain the different types of H.T cables with diagrams?	5	1	1	2
	OR				
2. c)	Explain the IE rules for domestic and industrial wiring?	5	1	1	2
2. d)	Explain the types of electrical distribution systems with neat diagram?	5	1	1	3
	Unit-II				
3. a)	Explain the Effects of electrical parameters on human body?	5	2	2	3
3. b)	What are the Indian standards for earthing?	5	2	2	3
	OR				
3. c)	Explain the different types of earthing with neat diagram?	5	3	2	2
3. d)	What are the Safety measures for electric shock?	5	2	2	2
	Unit-III				
4. a)	What are the main parts of substation?	5	3	3	3
4. b)	Explain the Gas insulated substation with neat diagram?	5	3	3	2
	OR				
4. c)	Draw and explain the single line diagram of substation?	5	4	3	1
4. d)	What are the difference between GIS and AIS?	5	3	3	1
	Unit-IV				
5. a)	Explain its advantages and disadvantages about Flat rate tariff?	5	2	4	2
5. b)	Explain its advantages and disadvantages about Three-part tariff?	5	2	4	3

P.T.O.

		M	L	CO	PO
	OR				
5. c)	Explain its advantages and disadvantages about Block rate tariff with one example?	5	3	4	1
5. d)	The maximum demand of a consumer is 20 A at 220 V and his total energy consumption is 8760 kWh. If the energy is charged at the rate of 20 paise per unit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional units, calculate: (i) annual bill (ii) equivalent flat rate.	5	2	4	2
	Unit-V				
6. a)	Explain laws of Illumination?	5	4	5	1
6. b)	Explain the working of Sodium Vapour Lamp with the neat diagram?	5	2	5	2
	OR				
6. c)	Explain the working of Fluorescent Lamp with the neat diagram?	5	5	5	2
6. d)	Explain the working of Mercury Vapour Lamp with the neat diagram?	5	2	5	3

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