H.T No: | | | | | | | | | | | **R18** **Course Code: A30353**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2025

Course Name: Micro Machining Processes

(Mechanical Engineering)

Date: 24.04.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Mention the important factors require for non-traditional machining methods.	2 M
2.	Write the applications of non-traditional machining processes.	2 M
3.	Write the features of Abrasive Flow Finishing process.	2 M
4.	Write the advantages of Magnetic Float polishing.	2 M
5.	List the applications of wire EDM.	2 M
6.	Discuss the influence of process parameters of EDDG.	2 M
7.	What is meant by Deburring? When it is to be done?	2 M
8.	List the advantages of Electro chemical Micromachining.	2 M
9.	Write the applications of Micro turning.	2 M
10.	List the advantages of Micro drilling.	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Classify non-traditional machining process and explain their selection for processing of different materials and the range of applications of it.	10M
	OR	
11. B).	With a neat sketch explain the working principle involved in Abrasive Water Jet Micro Machining along with its applications.	10M
12. A).	Explain briefly about the working principle of Magnetic Abrasive Finishing.	10M
	OR	
12. B).	Explain briefly about the working principle of Magnetorheological Finishing. Write its applications.	10M
13. A).	With a neat sketch explain the working principle involved in Electric Discharge Micromachining along with its applications	10M
	OR	
13. B).	Explain about the process involved in machining using Laser Beam Micromachining. Also write its advantages.	10M
14. A).	With a neat sketch explain the working principle involved in Electro Chemical Micromachining process	10M
	OR	
14. B).	Explain about the working principle involved in photo chemical Micromachining process.	10M
15. A).	Explain about the working principle involved in Micro Milling.	10M
	OR	
15. B).	Write the factors involved in selection of Micro Machining Process.	10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30374**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2025

Course Name: Non Conventional Sources of Energy

(Mechanical Engineering)

Date: 26.04.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Name the five fundamental sources of energy. 2 M
2. Classify types of non-conventional energy sources. 2 M
3. List out various types of solar energy collectors. 2 M
4. Write about Extraterrestrial Radiation and Terrestrial Radiation. 2 M
5. What are the main considerations in selecting a site for windgenerators? 2 M
6. Write the merits and demerits of wind power. 2 M
7. What is geothermal energy? 2 M
8. List out major benefits of using Biomass energy. 2 M
9. List out components of tidal power plant. 2 M
10. What is men by OTEC system? 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). What are the energy resources available in India? Explain. 10M

OR

11. B). (i) Define conventional and non-conventional Energy with Examples. 5M
(ii) Outline the merits and demerits of Conventional energy sources. 5M

12. A). Illustrate the functions of various components in flat plate collectors. 10M

OR

12. B). Explain the working principle of PV systems. 10M

13. A). Describe the functions of components of wind energy systems. 10M

OR

13. B). Illustrate the power generation process in HAWT with its merits anddemerits. 10M

14. A). Explain the Geothermal energy utilization for electric powergeneration. 10M

OR

14. B). What is the difference between biomass and biogas? and how does bio mass conversion takes place? 10M

15. A). List out the difference between wave and tidal energy. 10M

OR

15. B). What are the main types of OTEC power plants? Describe their working. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30375**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2025

Course Name: Jet Propulsions & Rocket Engineering

(Mechanical Engineering)

Date: 01.05.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. List the components of a turbojet engine. 2 M
2. Mention the factors that affect the thrust in a turbojet engine. 2 M
3. Distinguish between turboprop and turbofan engines. 2 M
4. Define specific impulse. 2 M
5. State Gibbs-Daltons law. 2 M
6. Differentiate between homogeneous and heterogeneous propellants. 2 M
7. List some of the liquid propellants used in rockets. 2 M
8. What is monopropellant? 2 M
9. Define gross thrust coefficient. 2 M
10. State the significance of atomization. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). A gas turbine cycle has a perfect heat exchanger. Air enters the compressor at 300 K and 1 bar and discharges at 475 K and 5 bar. After passing through the heat exchanger, the air temperature increases to 655 K. The temperature of air entering and leaving the turbine are 870°C and 450°C. Assuming no pressure drop across the heat exchanger, compute (i) the output per kg of air, (ii) the efficiency of the cycle and (iii) the work required to drive the compressor. 10M

OR

11. B). In a gas turbine, the pressure ratio to which air at 15°C is compressed is 6. The same air is then heated to a maximum possible temperature of 750°C, first in a heat exchanger and then in a combustion chamber. It is then expanded in two stages such that the expansion work is maximum. The air is reheated to 750°C after the first stage. Determine the cycle efficiency, the work ratio and net shaft work done per kg of air. 10M

12. A). With a neat sketch, explain the construction, working, advantages and disadvantages of a turbofan engine. 10M

OR

12. B). With a neat sketch, explain the construction, working, advantages and disadvantages of a ramjet engine. 10M

13. A). (i) Elaborate on the influence of binders on the properties of propellants. 5M

(ii) Explain the significance of using composites in oxidizers and binders. 5M

(P.T.O.)

OR

13. B). (i) Elucidate the factors that influence the burning rate. 5M
(ii) Describe a method by which burning rate is estimated. 5M

14. A). List the different types of igniters used in solid propellant rocket engines and explain any two of them. 10M

OR

14. B). Classify injector types used in liquid rocket propulsion systems and explain any two of them. 10M

15. A). Classify and compare IRR propulsion systems. 10M

OR

15. B). Discuss the different types of air intakes in integral rocket ramjet system. 10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30355**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2025

Course Name: Surface Engineering

(Mechanical Engineering)

Date: 01.05.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	What is Surface Engineering and why is it required?	2 M
2.	List out two Mechanical methods of surface preparation.	2 M
3.	Name the types of surface coatings.	2 M
4.	What is metallic coating?	2 M
5.	Define PVD process and present one method.	2 M
6.	What are Surface composites?	2 M
7.	What is Thermal Spray coating process?	2 M
8.	List out the various types of spray guns.	2 M
9.	What is diffusion coating process?	2 M
10.	What is Carburizing process?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Outline the scope of Surface engineering for different engineering materials.	10M
	OR	
11. B).	Explain about Electrochemical surface preparation method.	10M
12. A).	Summarize the methodology mechanism and applications of thermochemical processes.	10M
	OR	
12. B).	Compare the chemical conversion coating with metallic coating process.	10M
13. A).	Distinguish the methodology and mechanism of PVD from CVD process.	10M
	OR	
13. B).	Explain the process of surface modification by directed energy beams.	10M
14. A).	Compare any two thermal spray coating processes.	10M
	OR	
14. B).	Explain about surface preparation and finishing treatment in thermal spray process in detail.	10M
15. A).	Explain the methodologies of Carbonitriding and Siliconizing processes and their applications.	10M
	OR	
15. B).	Outline the various methods, mechanisms and reactions involved in Boronitriding process.	10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30341**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2025

Course Name: Operations Research

(Mechanical Engineering)

Date: 06.05.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Distinguish between Simplex and Big M Method. 2 M
2. Enlist the assumptions and requirements of LPP. 2 M
3. Compare and contrast transportation and transshipment. 2 M
4. Analyze the rules of travelling salesman problem. 2 M
5. Enlist the cost involved in replacement analysis of equipment. 2 M
6. Explain the rules of sequencing n Jobs through 3 machines. 2 M
7. Recall a zero sum game. 2 M
8. Classify various inventory models. 2 M
9. Describe Kendall notation for a queue. 2 M
10. State Bellman's optimality principle. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Solve the following L.P.P by using graphical method 10M

Maximize $Z = 40 X_1 + 100X_2$

Subject to constraints $2X_1 + X_2 \leq 500$

$2 X_1 + 5X_2 \leq 1000$

$x1, x2 \geq 0$

OR

11. B). Solve the following LPP by simplex method 10M

Maximize $Z= 5X_1+8X_2$,

subject to the constraints:

$3X_1+2X_2 \geq 3$,

$X_1+4X_2 \geq 4$,

$X_1+X_2 \leq 5$

and $X_1, X_2 \geq 0$

12. A). Sole the following Transportation method by using Vogel's approximation method to find IBFS and MODI method to find Optimal Solution. 10M

	D1	D2	D3	D4	Availability
O1	1	2	1	4	30
O2	3	3	2	1	50
O3	4	2	5	9	20
Requirement	20	40	30	10	

(P.T.O..)

OR

12. B). Solve the following assignment problem to minimize the total man-hours. 10M

Men / Task	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

13. A). A truck owner finds from his past experience that the maintenance costs Rs.200 for the first year and then increases by Rs.2000 every year, The cost of the truck type A is Rs.9000. Determine the best age at which to replace the truck. Truck B type cost Rs.10000.Annual Maintenance costs are Rs.400 and increased by Rs.800 every year. The truck owner now has truck type A which is one year old and should be replaced by Type B and if so when? 10M

OR

13. B). Find the sequence that minimizes total machining time to complete the following data: Find the total elapsed time. Also find the idle time on each machine. 10M

Tasks	A	B	C	D	E	F
Time on Machine I	4	9	8	5	10	9
Time on Machine II	5	4	3	6	2	5
Time on Machine III	7	8	6	12	6	7

14. A). In a game of matching coins with 2 players, A wins 1 unit value when there are 2 heads, wins nothing when there are 2 tails and looses ½ unit value when there are one head and one tail. Develop Pay Off matrix and value of the game. 10M

OR

14. B). CMR industry needs 5400 units per year of a bought out component which will be used in its main product. The ordering cost is Rs.250 per order and the carrying cost per unit per year is Rs.30. 10M

Which is the best order quantity?

Find the number of order per year and Frequency of orders?

15. A). A tax consulting firm has 4 counters in its office to receive people who have problems concerning their income tax. On the average 64 persons arrive in an 7-hour day. Each tax adviser spends 16 minutes on an average on an arrival. If the arrivals follow poisson distribution and service times are according to exponential distribution, find 10M

i) The average number of customers in the system

ii) The average number of customers waiting to be served

iii) Average time a customer spends in the system

iv) Average waiting time of a customer

OR

15. B). Using dynamic programming approach solve the below problem 10M

Maximize

$Z = 7X_1 + 8X_2$

subjected to

$2X_1 + X_2 \leq 8$

$5X_1 + 2X_2 \leq 15$

$X_1, X_2 \geq 0$

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