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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: OPERATIONS RESEARCH

(Mechanical Engineering)

Date: 19.04.2024 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1. Write the applications of Operations Research related to industry. 2 M
2. What is the Optimal Solution in Operations Research? 2 M
3. What is the significance of MODI method? 2 M
4. What is the initial basic feasible solution? 2 M
5. What are the benefits of sequencing? 2 M
6. What is the time value of money methods in replacement? 2 M
7. Define saddle point in game theory. 2 M
8. What are the Factors Affecting Inventory management? 2 M
9. What are the characteristics of queuing system? 2 M
10. Write any two characteristics of dynamic programming. 2 M

PART-B

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

11.A). Use simplex method to solve LP Problem 10M

$2X1+3X2=8$ Subjected to constraints

i) $2X1+3X2 \leq 8$ ii) $2X2+5X3 \leq 10$ iii) $3X1+2X2+4X3 \leq 15$ and iv) $x1, x2, x3 \geq 0$

OR

11. B). Using graphical method solve 10M

Min $Z= -4X1+3X2$ Subjected to constraints

i) $X1-X2 \leq 0$ ii) $X1 \leq 4$ and iii) $x1, x2 \geq 0$

12. A). Explain the steps of assignment problem. 10M

OR

12. B). Using Northwest Corner Method of determining basic feasible solution. Determine optimal transportation cost 10M

	Retail Agency					
Factories	1	2	3	4	5	Capacity
1	1	9	13	36	51	50
2	24	12	16	20	1	100
3	14	33	1	23	26	150
Requirement	100	60	50	50	40	300

(P.T.O..)

13. A). There are five jobs, each of which must go through the two machines A and B in the order AB. Processing times (in hours) are given in the table 10M

Job	Job 1	Job 2	Job 3	Job 4	Job 5
M-A	5	1	9	3	10
M-B	2	6	7	8	4

OR

13. B). Derive an expression for Time value of money in replacement. 10M

14. A). Discuss different types of inventories. Derive an expression for EOQ. 10M

OR

14. B). Solve the game with the following pay-off matrix 10M

Player Y

Strategies

Player X Strategies	*I*	*II*	*III*	*IV*	*V*
1	9	12	7	14	26
2	25	35	20	28	30
3	7	6	−8	3	2
4	8	11	13	−2	1

15. A). A petroleum company is considering expansion of its one unloading facility at its refinery. Due to random variations in weather, loading delays and other factors, ships arriving at the refinery to unload crude oil arrive at a rate of 5 ships per week. The service rate is 10 ships per week. Assume arrivals follow a Poisson Process and the service time is exponential. a) Find the average time a ship must wait before beginning to deliver its cargo to the refinery. b) If a second berth is rented what will be the average number of ships waiting before being unloaded? 10M

OR

15. B). Solve using dynamic programming 10M

Max $z= 50x1+100x2$

S.T $2x1+3x2 \leq 48$,

$x1+3x2 \leq 42$

$x1, x2 \geq 0$

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: MICRO MACHINING PROCESSES

(Mechanical Engineering)

Date: 24.04.2024 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1. What are the advantages of MMP? 2 M
2. What are the applications of USSM? 2 M
3. What are the advantages of abrasive flow finishing? 2 M
4. What is the Magnetorheological Abrasive Flow Finishing (MRAFF)? 2 M
5. Mention the basic requirement of tool materials for EDM. 2 M
6. Write the advantages and limitations of EDDG. 2 M
7. Mention the tool materials and why it is used for electro chemical micromachining process. 2 M
8. Write the advantages of electrochemical deburing. 2 M
9. What is the micro drilling? 2 M
10. What are the requirements of micromachining process? 2 M

PART-B

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

11.A). Explain the process parameters that influence AJMM and List its applications and limitations. 10M

OR

11. B). With neat sketch explain the abrasive water jet micro machining process. 10M

12. A). Explain the process parameters in MAF process, List its application and limitations. 10M

OR

12. B). With neat sketch explain the magnetic float polishing process, List its application and limitations. 10M

13. A). Describe the working principles and element of laser beam micromaching process. 10M

OR

13. B). Briefly Discuss about the EDMM, List its application and limitations. 10M

14. A). With neat sketch explain the working principle of ECMM process and list its application and limitations. 10M

OR

14. B). Explain about chemical and photochemical micromaching. 10M

15. A). Explain the working principle of focused ion beam machining with neat sketch. 10M

OR

15. B). Classify the common traditional methods. Give a list of such operations. 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-2024

Course Name: Non Conventinal Sourece of Energy

(Mechanical Engineering)

Date: 26.04.2024 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1.	Write differences between renewable and nonrenewable sources.	2 M
2.	State conventional and non-conventional Energy sources with Examples.	2 M
3.	Describe the effect of temperature on the performance of flat plate collector.	2 M
4.	List out various types of solar energy collectors.	2 M
5.	What components are there in windmill and also sketch it?	2 M
6.	List out various types of VAWT.	2 M
7.	In hydrothermal system, what other particles are there in steam and water.	2 M
8.	How the temperature effects the biogas production in the digesters?	2 M
9.	Mention the limitations of wave energy conversion.	2 M
10.	List out the special applications of OTEC plants.	2 M

PART-B

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

11.A).	Outline the merits and demerits of Conventional energy sources.	10M
	OR	
11. B).	How do you classify the energy sources and brief them?	10M
12. A).	How is the performance of a flat plate solar collector evaluated?	10M
	OR	
12. B).	What is the principle of solar photovoltaic power generation? What are the main elements of a solar photovoltaic conversion system?	10M
13. A).	Derive expressions for the forces acting on the blades of a wind turbine.	10M
	OR	
13. B).	Differentiate between HAWT and VAWT and sketch them.	10M
14. A).	Draw the exhaust types of conventional steam turbines and explain in details.	10M
	OR	
14. B).	Illustrate Constructional details of biomass gasifier.	10M
15. A).	How it works a Float Wave Power Machine, write with the help of a simple diagram?	10M
	OR	
15. B).	List out the associated problems facing commercial development of OTEC system.	10M

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April-2024

Course Name: SURFACE ENGINEERING

(Mechanical Engineering)

Date: 29.04.2024 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1.	Define the surface engineering.	2 M
2.	List out the classification of surface preparation processes.	2 M
3.	Classification of various coating methods.	2 M
4.	What is the difference between chemical and metallic coating?	2 M
5.	List the different surface modification methods.	2 M
6.	Write the difference between Sputtering and Ion implantation.	2 M
7.	State the advantages of finishing treatment.	2 M
8.	Explain the importance of coating properties and its applications.	2 M
9.	List out the various methods used in diffusion coatings.	2 M
10.	Write the working principle of carburizing coating.	2 M

PART-B

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

11.A).	Discuss the need of surface preparation processes and explain the Hydro blasting process with neat sketch?	10M
	OR	
11. B).	Explain the vapour phase degreasing method for surface preparation with neat sketch.	10M
12. A).	Explain briefly the coating processes (i) Chromating (ii) Hot dipping.	10M
	OR	
12. B).	List out different mechanical coating processes and explain any one with neat sketch and with the applications?	10M
13. A).	What do you mean by CVD? With neat diagram discuss any three methods of CVD coating.	10M
	OR	
13. B).	List out methods for surface modification and explain plasma surface modification.	10M
14. A).	What is thermal spray coating processes? Explain Conventional flame spray.	10M
	OR	
14. B).	Explain briefly the types of spray guns, any one with neat sketch.	10M
15. A).	Briefly describe about the siliconizing coating and chromizing coating.	10M
	OR	
15. B).	Explain different methods used for testing and selection of coatings.	10M

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