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**R18**

Course Code: A30341



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

**Course Name: OPERATIONS RESEARCH**

**(Mechanical Engineering)**

**Date: 27.04.2023 FN**

**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.               | 2 M |
| 2. What are the advantages of linear programming?               | 2 M |
| 3. What is degeneracy in transportation problem?                | 2 M |
| 4. What is a travelling salesman problem?                       | 2 M |
| 5. Explain why replacement is needed.                           | 2 M |
| 6. What is Johnson's algorithm for n jobs two machines?         | 2 M |
| 7. What are the properties for game theory?                     | 2 M |
| 8. What are the various costs involved in inventory management? | 2 M |
| 9. Define dynamic programming and explain its need.             | 2 M |
| 10. What are the Queuing Models in Queuing theory.              | 2 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). i) Explain the various types of models in Operations Research. 4M  
 ii) Write the dual of the following Primal problem. 6M  
 Maximize  $Z = x_1 + 2x_2 + 3x_3$  Subject to:  
 $x_1 + x_2 + x_3 \leq 25$   
 $x_1 + x_2 \leq 10$   
 $x_2 + 2x_3 \leq 15$   
 $x_1, x_2, x_3 \geq 0$

**OR**

- 11.B). An animal feed company must produce 200 Kg of a mixture containing of ingredients A and B respectively. Ingredient A Costs Rs. 3/- per Kg. And B costs Rs. 8/- per Kg. No more than 80 Kg of A can be used and at least 60 Kg of B must be used. Find how much of each ingredients should be used if the company wants to minimize cost. 10M

**(P.T.O.)**

12. A). Find the optimal solution for the following transportation problem using MODI method. 10M  
(find IBFS using VAM)

	I	II	III	IV	Capacity
A	5	2	4	3	22
B	4	8	1	6	15
C	4	6	7	5	8
Demand	7	12	17	9	

OR

12. B). Solve the minimal assignment problem. 10M

Job	Machinist			
	1	2	3	4
A	12	30	21	15
B	18	33	9	31
C	44	25	24	21
D	23	30	28	14

13. A). The following mortality has been observed for a certain type of IC's used in a digital computer: 10M

Week	1	2	3	4	5
% Failure by the end of the week	10	25	50	80	100

Group replacement of IC's costs Rs.0.30 per transistor, where as individual replacement costs Rs.1.25. What is the best interval between group replacements? At what group replacement price per transistor would a policy of strictly individual replacement become preferable to the adopted policy.

OR

13. B). Five jobs, each of which must go through the machines A, B and C in the order BAC. 10M

Job Number	1	2	3	4	5
Machine A	3	2	5	6	4
Machine B	6	8	7	10	6
Machine C	4	8	6	7	8

Determine a sequence for the jobs that will minimize the total elapsed time.

(P.T.O.)

14. A). A and B play a game in which each has three coins 5 paise, 10 paise and 20 paise, each selects a coin without the knowledge of other's choice. If the sum of coins is an odd amount, A wins B's coin, if the sum is even B wins A's coin. Find the best strategies for each player and the value of the game. 10M

OR

14. B). i) Annual demand for an item is 6000 units Ordering cost is Rs600 per order. Inventory carrying cost is 18% of purchase price/unit /year. price break up is as shown 8M

Quantity	Price
$0 \leq q_1 < 2000$	20
$2000 \leq q_2 < 4000$	15
$4000 \leq q_3$	9

Find optimal order size.

- ii) Define EOQ. 2M

15. A). People arrive at a theatre ticket booth in a Poisson distribution arrival rate of 50 per hour. Service time is constant at 90 seconds. Calculate i. the mean number in the waiting line ii. the mean waiting time iii. the percent of time an arrival can walk right in without having to wait. 10M

OR

15. B). i) Solve the following linear programming problem by using dynamic programming. 8M  
Max  $Z = 8x_1 + 7x_2$   
Subject to the constraints:  
 $2x_1 + x_2 \leq 8$ ,  
 $5x_1 + 2x_2 \leq 15$ ;  
 $x_1, x_2 \geq 0$ .
- ii) What is dynamic programming and what sort of problems can be solved using dynamic programming. 2M

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**R18**

Course Code: A30163



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

Course Name: **AIR POLLUTION & CONTROL**

(Common for EEE, ME, ECE, CSE & IT)

Date: 29.04.2023 FN

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 Air Pollution. 2 M
2. Broadly classify the air pollutants. 2 M
3. Define turbulence. 2 M
4. What is called temperature lapse rate? 2 M
5. Differentiate Indoor air pollution from others. 2 M
6. What is stack air pollution? 2 M
7. List out the various control technique. 2 M
8. Write a note on scrubbers. 2 M
9. Discuss any one global episode as environmental issue. 2 M
10. List out noise standards. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss in detail about the characterization of air pollutants. 10M
- OR**
11. B). Explain the effects of air pollution on health. 10M
12. A). Discuss in detail about Wind rose diagram. 10M
- OR**
12. B). Explain about plume behavior in detail. 10M
13. A). Discuss about Sampling of particulate pollutants. 10M
- OR**
13. B). Explain about Gaussian dispersion model 10M
14. A). Discuss in detail about settling chambers. 10M
- OR**
14. B). Explain about cyclone separators. 10M
15. A). How to control air pollution due to automobiles? 10M
- OR**
15. B). Explain about environmental laws and acts. 10M

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**R18**

Course Code: A30353



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

**Course Name: MICRO MACHINING PROCESSES**

**(Mechanical Engineering)**

**Date: 02.05.2023 FN**

**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.  | Name the three main subsystems of a micro abrasive water jet machining.                  | 2 M |
| 2.  | What are the abrasives used in USMM process?   | 2 M |
| 3.  | What are the size ranges of the abrasives used in Magnetic abrasive finishing?           | 2 M |
| 4.  | In finishing processes, why finishing rate is more important than material removal rate? | 2 M |
| 5.  | What are functions of dielectric fluid used in EDM?                                      | 2 M |
| 6.  | List the applications of EBMM.   | 2 M |
| 7.  | What are limitations and applications of ECMM?   | 2 M |
| 8.  | What properties are expected from the electrolyte used in the ECMM?                      | 2 M |
| 9.  | List out any two applications of Micro Drilling.   | 2 M |
| 10. | Write two applications of Micro turning.   | 2 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- |           |  |     |
|-----------|--|-----|
| 11.A).    | Explain in brief, the mechanism of material removal in the case of mechanical type, thermal type, chemical and electro chemical type MMPs. | 10M |
| <b>OR</b> |  |     |
| 11.B).    | Compare the Conventional & Non-Conventional Machining Processes in at least ten important aspects.   | 10M |
| 12.A).    | Explain the working principle of MRAFF process. Write its specific application   | 10M |
| <b>OR</b> |  |     |
| 12.B).    | Explain briefly about MAF & MRF.   | 10M |
| 13.A).    | Explain the wire EDM process with respect to process equipment, applications, advantages and limitations.                                  | 10M |
| <b>OR</b> |  |     |
| 13.B).    | Explain the working principle of EBMM with neat sketch and list out the advantages and Limitations.  | 10M |
| 14.A).    | Explain the principle of Chemical Micromachining. Write its advantages & limitations.  | 10M |
| <b>OR</b> |  |     |
| 14.B).    | Discuss the major factors of Electrochemical Micromachining (ECMM) process.  | 10M |
| 15.A).    | Discuss about any two Traditional Mechanical Micromachining Processes including applications.  | 10M |
| <b>OR</b> |  |     |
| 15.B).    | Explain the factors influencing the Selection of Micro Machining Processes in detail.  | 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/May-2023

Course Name: **NON CONVENTIONAL SOURCES OF ENERGY**  
(Mechanical Engineering)

Date: 04.05.2023 FN

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 Limitations of renewable energy Sources? 2 M
2. Write differences between renewable and nonrenewable energy sources. 2 M
3. What are the advantages and disadvantages of concentrating collectors over flat - plate collectors? 2 M
4. Define solar radiation and solar irradiation. 2 M
5. Differentiate between HAWT and VAWT. 2 M
6. Write the merits and demerits of wind power. 2 M
7. What are the environmental impacts of geothermal energy? 2 M
8. List out major benefits of using Biomass energy. 2 M
9. What are the advantages of Wave energy conversion? 2 M
10. What are the limitations of tidal power generation? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain conventional and non-conventional Energy sources with Examples. 10M
- OR**
11. B). Compare different non-conventional energy resources and conventional energy resources. 10M
12. A). Explain the principle of conversion of solar energy into heat. 10M
- OR**
12. B). Explain the process of generation of power in solar pond with a neat sketch and also mention its merits and demerits. 10M
13. A). Explain with a neat sketch the working of a wind energy systems with main components. 10M
- OR**
13. B). Explain about Vertical Axis Wind Turbine with a neat sketch. 10M
14. A). What is biomass direct combustion? Explain in detail 10M
- OR**
14. B). Classify the Biomass energy conversion systems and explain them in brief. 10M
15. A). Explain the closed cycle OTEC System, with its advantages over open cycle system. 10M
- OR**
15. B). List out differences between tidal and wave power generation. 10M

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**R18**

Course Code: A30355

**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

**Course Name: SURFACE ENGINEERING****(Mechanical Engineering)****Date: 06.05.2023 FN****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. Describe the surface preparation method for electroplating of steel. 2 M
2. Outline the new generation surface engineering techniques. 2 M
3. How would you differentiate chemical conversion coating with metallic coating? 2 M
4. How the important process parameters in selecting chemical conversion coatings? 2 M
5. State the physical principle underlying the functioning of electron beam equipment for electron emission. 2 M
6. What is detonation hardening and its applications? 2 M
7. What are the various forms of thermal spraying? 2 M
8. What is HVOF and its significance in surface engineering? 2 M
9. What are the benefits of siliconizing process under diffusion coating? 2 M
10. Determine the various process parameters affects carburizing diffusion coating outcome. 2 M

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

- 11.A). How would you apply the mechanical techniques for preparing the surface layers? Explain any one method in detail. 10M

**OR**

11. B). What is the benefit of vapor degreasing systems? Brief any one of the principal systems under vapor degreasing technique. 10M

12. A). What is Chromating? Suggest the methodology for applying it. 10M

**OR**

12. B). How would you apply any of the electrolytic and electroless plating in order to deposit a metallic coating on material? 10M

13. A). Explain any one PVD method with its significance. 10M

**OR**

13. B). How would you apply the surface modification by friction stir process on materials? 10M

14. A). How the spray guns in thermal spray coatings are used? Draw any one schematic to explain the working of spray guns. 10M

**OR**

14. B). Evaluate high-velocity oxyfuel (HVOF) technique with schematic. 10M

15. A). Elaborate any one diffusion coating method with practical applications. 10M

**OR**

15. B). Explain the Aluminizing and Chromizing diffusion coating process. 10M

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**R18**

Course Code: A30531



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

Course Name: PYTHON PROGRAMMING

(Common for all Branches)

Date: 08.05.2023 FN

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. List the basic data types available in Python with examples. 2 M
2. Mention any two limitations of Python. 2 M
3. Define recursion with an example. 2 M
4. Compare lists and array. 2 M
5. How will you update list items? Give one example. 2 M
6. Can functions return tuples? If yes give example. 2 M
7. What are instance variables, and what role does the name self play in the context of a class definition? 2 M
8. Explain what the \_\_str\_\_ method does and why it is a useful method to include in a class 2 M
9. Why does the blur function need to work with a copy of the original image? 2 M
10. What happens when you enter a number with a decimal point into an Integer Field? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Write about different types of python operators with example scripts. 10M
- OR**
11. B). Sketch the structures of interpreter and compiler. Details the difference between them. Explain how python works in Interactive mode and script mode with examples. 10M
12. A). Write a program to determine the factorial of a given number with and without the use of recursion. 10M
- OR**
12. B). Write the syntax and explain the concept of 10M
    - (i) recursive function with an example.
    - (ii) lambda function with an example.
13. A). Write a function that takes a number as an input parameter and returns the corresponding text in words, for example, on input 452, the function should return 'Four Five Two'. Use a dictionary for mapping digits to their string representation. 10M
- OR**
13. B). Describe the following: 10M
    - (i) Creating the list
    - (ii) Accessing values in the lists
    - (iii) Updating the list
    - (iv) Deleting the list elements.

(P.T.O..)



14. A). i) Write a short notes on Special Class methods, with the help of an example explain the significance of the `_init_()` method. 5M  
ii) Write a short notes on different built in attributes associated with a class. 5M

**OR**

14. B). Write a menu driven program that keeps record of books and journals available in a library. 10M

15. A). Write a line of code that adds a Float Field to a window, at position (1, 1) in the grid, with an initial value of 0.0, a width of 15, and a precision of 2. 10M

**OR**

15. B). Explain the turtle graphics with two dimensional shapes. 10M

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**R18**

Course Code: A30555



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

**Course Name: INTRODUCTION DATABASE MANAGEMENT SYSTEMS**  
(Common for EEE, ME & ECE)

**Date: 08.05.2023 FN**

**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. Identify the Difference between Traditional file Systems and DBMS. 2 M
2. Classify the Aggregation Operations. 2 M
3. Discuss the Referential Integrity. 2 M
4. Interpret the Advantages and Disadvantages of VIEWS. 2 M
5. Outline the Purpose of ANY and ALL in SQL. 2 M
6. How to Sort Results in SQL? 2 M
7. Determine the Control Statements in Advanced SQL. 2 M
8. Identify the need of Cursors in SQL. 2 M
9. Elaborate the Purpose of Normalization. 2 M
10. Interview the Rule to be followed in 3NF. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

**5x10=50M**

- 11.A). i) Analyze the Unary Operations. 5M  
ii) Classify the Set Operations. 5M
- OR**
11. B). i) Outline the SPARC Architecture. 5M  
ii) List the Join Operations. 5M
12. A). Illustrate the Entry Integrity, Domain Constraints and General Constraints in SQL. 10M
- OR**
12. B). i) Design the VIEW Materialization. 5M  
ii) Evaluate the Restrictions on VIEWS. 5M
13. A). i) How to handle the Aggregate Functions? 5M  
ii) Write Sub queries in SQL. 5M
- OR**
13. B). Outline how to Handle Multi-table Queries in SQL. 10M
14. A). How to create functions in SQL explain with an example? 10M
- OR**
14. B). What is a trigger? How to create it? Discuss various types of triggers. 10M
15. A). Show the criteria how Normalization Supports Database Design. 10M
- OR**
15. B). Elaborate about 2NF, 3NF and BCNF with suitable examples. 10M

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**R18**

Course Code: A30554



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

Course Name: JAVA PROGRAMMING

(Common for EEE, ME & ECE)

Date: 08.05.2023 FN

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. Use of JVM. 2 M
2. What are the different possibilities of creating of objects? 2 M
3. Use of "final" keyword in Java. 2 M
4. Types of Inheritance concept. 2 M
5. What is checked Exception? 2 M
6. Explain different Exception names which occur in general. 2 M
7. What are the methods used for start and execute the Thread? 2 M
8. What is the purpose of the sleep() method in Thread? 2 M
9. Which packages need to import to work with Files in Java? 2 M
10. Discuss different Streams in java files with sample. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain about Constructor Overloading and Method OverLoading with example. 10M
- OR**
11. B). What are the different access specifiers in Java, illustrate with example? 10M
12. A). Build a matrix multiplication program using Two-Dimensional Arrays. 10M
- OR**
12. B). Test about Command line arguments, find the highest value among the 3 command line arguments. 10M
13. A). Sample examine for creation of packages, accessing a package and hiding the classes. 10M
- OR**
13. B). What is nested try with example? Role of the "finally" key word Exception handling? 10M
14. A). What is difference between Process and Thread? How Thread is useful than Process? 10M
- OR**
14. B). Explain, Why Thread sleep() and yield() methods are static? 10M
15. A). What is the difference between BufferedReader and Scanner in Java with example? 10M
- OR**
15. B). When does java.io.FileNotFoundException: (Access is denied) comes? How do you fix that, illustrate with suitable example? 10M

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**R18**

Course Code: A30160



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech VII Semester Supplementary Examinations April/May-2023

Course Name: **DISASTER MANAGEMENT & MITIGATION**

(Common for EEE, ME, ECE CSE & IT)

Date: 08.05.2023 FN

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. State different types of the disasters. 2 M
2. Define landscape approach. 2 M
3. Name the types of endogenous hazards. 2 M
4. Write on man induced disaster. 2 M
5. List three major causes of earth quakes occurred in India. 2 M
6. Briefly write on the occurrence of landslides. 2 M
7. Differentiate between cold wave and heat wave. 2 M
8. List the impacts of floods in India. 2 M
9. Write about the emergency stage of disaster management. 2 M
10. Give an insight on mitigation techniques of any one type of disaster. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss about the environmental stress and concept of environmental hazard. 10M
- OR**
11. B). Explain in detail on human ecology and its application on geographical researches. 10M
12. A). Differentiate between man induced hazards and natural hazards. 10M
- OR**
12. B). Describe in detail about endogenous and exogenous hazards. 10M
13. A). Discuss the environmental impacts of volcanic eruptions. 10M
- OR**
13. B). Explain the distribution of earthquakes and methods to reduce effects of the earthquake. 10M
14. A). Write the methods of conservation measures for soil erosion. 10M
- OR**
14. B). Discuss in detail about chemical hazards and nuclear explosion. 10M
15. A). Explain the role of an engineer to reduce the effects of different disasters occurred in India. 10M
- OR**
15. B). Describe in detail the emerging approaches of disaster management and recommend some remedies to control the disasters. 10M

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