

H.T No:

R18

Course Code: A36601



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: MACHINE LEARNING

(CSM)

Date: 21.02.2023 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. List out any four applications of machine learning. 2 M
2. What is the importance of Vapnik-Chervonekis (VC) dimension? 2 M
3. Find the distance of the point (1, -2, 3) from the hyperplane
 $3x_1 - 4x_2 + 12x_3 - 1 = 0$ 2 M
4. What are the limitations of Bayesian Decision Theory? 2 M
5. Classify the commonly used dimensionality reduction techniques in machine learning? 2 M
6. Define mixture densities. 2 M
7. Compare linear regression and logistic regression. 2 M
8. Define potential function with an example. 2 M
9. What is Bagging? 2 M
10. Define a perceptron. 2 M

PART-B

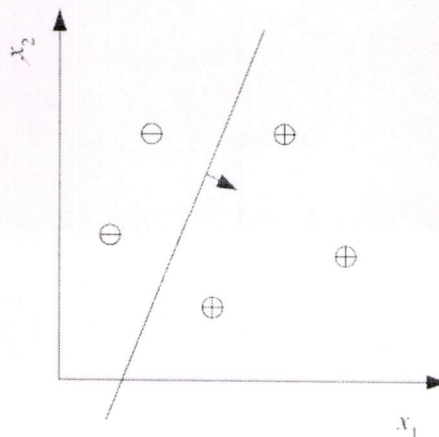
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain Linear regression with suitable example. List the assumptions required for Linear regression. 10M

OR

11. B). If hypothesis class is the set of lines, and a line is used to separate the positive and negative examples, instead of bounding the positive examples as in a rectangle, leaving the negatives outside (as shown in the figure below). Prove that the VC dimension of a line is 3. 10M



(P.T.O..)

12. A). Explain the general MLE method for estimating the parameters of a probability distribution. Deduce the expression to estimate the parameters for the Gaussian distribution. 10M

OR

12. B). For a two-class problem, develop normal samples for two classes with different variances, then use parametric classification to estimate the discriminant points. 10M

13. A). Given the data in Table below, apply PCA to reduce the dimension from 2 to 1. 10M

Feature	Example 1	Example 2	Example 3	Example 4
X1	4	8	13	7
X2	11	4	5	14

OR

13. B). For the given data points, build the dendrogram using Complete Linkage method in clustering? 10M

	X	Y
P1	0.40	0.53
P2	0.22	0.38
P3	0.35	0.32
P4	0.26	0.19
P5	0.08	0.41
P5	0.45	0.30

14. A). Using the data in Table below, develop a regression tree to predict the values of y. 10M

X1	1	3	4	6	10	15	2	7	16	0
X2	12	23	21	10	27	23	35	12	27	17
y	10.1	15.3	11.5	13.9	17.8	23.1	12.7	43.6	17.6	14.9

OR

14. B). Explain how does a Gradient Descent Algorithm work in Machine Learning. 10M

15. A). Develop a network of perceptrons to implement the following Boolean functions. 10M

- (i) A AND B
- (ii) A OR B
- (iii) A XOR B

OR

15. B). Explain the Back propagation learning algorithm and its limitations. 10M

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Course Code: A30511



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: DESIGN & ANALYSIS OF ALGORITHMS
(Common for CSE, IT & CSM)

Date: 23.02.2023 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 is an algorithm? Write an algorithm to find the biggest of two numbers. 2 M
2. Define time complexity. 2 M
3. Write the general method of greedy method. 2 M
4. Write the Purging rule of 0/1 knapsack rule. 2 M
5. What is Hamiltonian cycle? 2 M
6. Define the terms e-node, live-node, and dead-node. 2 M
7. What is topological sorting give example? 2 M
8. List the algorithm to find the shortest path of a graph. 2 M
9. Write the types of reduction techniques. 2 M
10. What is intractable problem? 2 M

PART-BAnswer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain various asymptotic Notations with example. 10M
- OR**
11. B). i) Solve $T(n)=2T(n/2)+n$ using substitution method 5M
ii) Analyze the time complexity of factorial of a given number. 5M
12. A). i) Derive the time complexity for strassen's matrix multiplication. 5M
ii) Find the optimal solution of the Knapsack instance $n=3$, $M=20$, $(P_1,P_2,P_3)=(25,24,15)$ and $(W_1,W_2,W_3)=(18,15,10)$ using greedy method. 5M
- OR**
12. B). Construct OBST for the given identifier set $(a_1,a_2,a_3,a_4) = (\text{cout,float,if,while})$ with $p(1,2,3,4)=(1/20,1/5,1/10,1/20)$ and $q(0,1,2,3,4)=(1/5,1/10,1/5,1/20,1/20)$. 10M
13. A). i) Explain graph coloring with an example? 5M
ii) Find the sum of subsets for the following set of integers $s = \{5, 10, 12, 13,15,18\}$ for $W=30$. 5M

OR

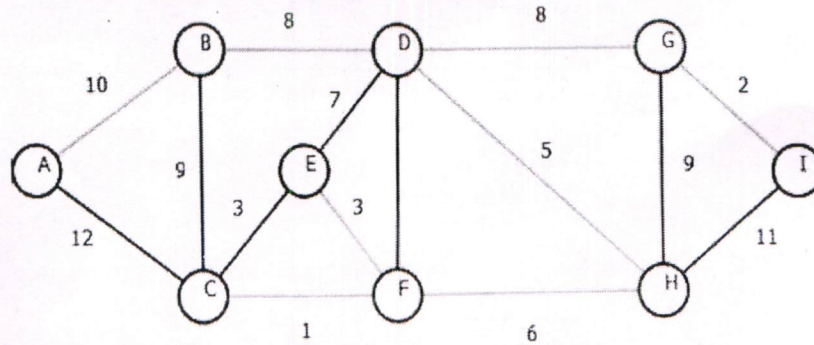
13. B). Solve Travelling Sales person problem using LC branch and bound method for the given adjacency matrix of undirected graph 10M
- | | | | | |
|----------|----------|----------|----------|----------|
| ∞ | 20 | 30 | 10 | 11 |
| 15 | ∞ | 16 | 4 | 2 |
| 3 | 5 | ∞ | 2 | 4 |
| 19 | 6 | 18 | ∞ | 3 |
| 16 | 4 | 7 | 16 | ∞ |

(P.T.O..)

14. A). i) Explain the BFS algorithm with an example. 5M
 ii) Discuss about network flow algorithm with example. 5M

OR

14. B). i) Find Minimum Spanning tree using Kruskal algorithm for the given graph 5M



- ii) Describe about transitivity closure of a graph with example. 5M

15. A). i) Write non deterministic algorithm for 0/1 knapsack problem. 5M
 ii) Explain Game tree with an example. 5M

OR

15. B). i) State whether Node cover decision problem is NP complete or hard. Justify your answer. 5M
 ii) Explain the classes of NP hard and NP complete problems. 5M

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Course Code: A30516



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: OPERATING SYSTEMS

(Common for CSC & CSM)

Date: 25.02.2023 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 Operating-System Services? 2 M
2. Draw the Layered structure of Operating system. 2 M
3. Define a thread. 2 M
4. What are the various operations performed on processes? 2 M
5. What is Process Synchronization? 2 M
6. What is Counting semaphore? 2 M
7. List the disadvantages of single contiguous memory allocation. 2 M
8. Differentiate between Logical and Physical address space. 2 M
9. Explain the bit vector representation of free space management. 2 M
10. Write the usage of read and write system calls. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in detail about services provided by Operating System. 10M
- OR**
11. B). What is the purpose of system call? List out various types of system calls? 10M
12. A). Consider the following processes with the length of the CPU burst given in milliseconds. Calculate the Average Waiting Time and Average Turnaround Time for i) Non-preemptive SJF ii) Preemptive SJF 10M

Process	Arrival Time	Burst Time
1	0	8
2	1	4
3	2	9
4	3	5

OR

12. B). Discuss about various scheduling criteria for CPU Scheduling. 10M
13. A). What are the major activities of an operating system in regard to process management? Explain. 10M
- OR**
13. B). What is the need for synchronization? How is process synchronization achieved? 10M

(P.T.O..)

14. A). Discuss Segmentation in detail with hardware implementation and compare it with paging. 10M

OR

14. B). Compute the number page faults for optimal page replacement strategy for the given reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8, 9,5,4,5,4,2 with 4 page frames. 10M

15. A). List out the various methods for free-space management and explain them in detail. 10M

OR

15. B). Explain free space management techniques in detail. 10M

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Course Code: A30509



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: DATABASE MANAGEMENT SYSTEMS

(CSM)

Date: 28.02.2023 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. How to represent a weak and strong entity set in ER diagram? Quote suitable example. 2 M
2. What is DBA? Mention the functionalities of DBA. 2 M
3. Differentiate primary key and unique constraints. Give one example to each. 2 M
4. Give the general form of SQL query. 2 M
5. Define 3NF and write down its basic properties. 2 M
6. What is meant by spurious tuples? Give example. 2 M
7. What is the role of Serializability using transactions? 2 M
8. Illustrate multiple granularities. 2 M
9. Compare volatile and nonvolatile storage. 2 M
10. What is primary and secondary index? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the architecture of DBMS with a neat diagram. 10M
- OR**
11. B). i) List out the different types of database users? Discuss the roles of each user. 5M
ii) Discuss Specialization, Generalization and Aggregation concept used in ER-Diagrams with suitable examples. 5M
12. A). i) What is a view in SQL? When can views be updated? Give a sql statement to create a view. 5M
ii) What is a co-related nested query? Give an example. 5M
- OR**
12. B). i) Discuss the importance of entity integrity and referential integrity constraints. 4M
ii) Consider the following database schema to write queries in SQL. 6M
Student (Snum: integer, Sname : string, major: string, level: string, age: integer)
Class (Cname: string, meets_at: time, room: string, fid: integer)
Enrolled (Snum: integer, Cname: string)
Faculty (Fid: integer, Fname: string, deptid: integer)
a) List the students' numbers taught by faculty member "Ravi".
b) Find the list of faculty ids taking class in same room.
c) Find the student details of ECE major.

(P.T.O..)

13. A). i) Differentiate between relational algebra and relational calculus. 5M
ii) What are the problems caused by redundancy? Explain with an example. 5M

OR

13. B). Explain the different operations in Relational Algebra with the help of an example. 10M

14. A). i) Explain ensuring atomicity and durability properties for a transaction by DBMS. 5M
ii) Explain view Serializability with an example? How it is different from conflict Serializability? 5M

OR

14. B). What is a transaction? Explain its properties and also explain its five state transition diagram. 10M

15. A). State and explain various file organization methods. Give suitable examples to each them. 10M

OR

15. B). Explain B+ Trees with example. 10M

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Course Code: A30473

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

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: **IMAGE PROCESSING**

(Common for CSE, IT, CSC & CSM)

Date: 04.03.2023 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. List the basic steps involved in image processing. 2 M
2. Mention the properties of 2D DFT. 2 M
3. List the uses histogram for the image enhancement. 2 M
4. What is the difference between spatial and frequency domains in filtering. 2 M
5. What is an order statistics filter? List the different statistics filters. 2 M
6. Mention the Possible classification of restoration methods. 2 M
7. Define opening and closing operation. 2 M
8. Explain Region oriented segmentation. 2 M
9. List and define different redundancies. 2 M
10. Compare Lossless and Lossy compression. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). With a neat block diagram, explain the components of image processing system. 10M

OR

11. B). Determine Hadamard matrix for N=4. 10M

12. A). Perform histogram equalization of the 5x5 image whose data is shown in Table shown below. 10M

Gray level	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	6	14	5	0	0

OR

12. B). Explain the smoothing of images in frequency domain using:
-
- i) Ideal high pass filter and ii) Butterworth high pass filter. 10M

13. A). Explain in brief, the inverse filtering approach and its limitations. 10M

OR

13. B). Write a short note on Weiner filtering and inverse filtering. 10M

(P.T.O..)

14. A). Discuss in detail the hit or miss Transformation method. 10M

OR

14. B). What are the derivative operators useful in image segmentation? Explain their role in segmentation? 10M

15. A). With neat diagram, explain transform based compression method. 10M

OR

15. B). Derive the code for string "went." Comprising characters with probability of $e = 0.3$, $n = 0.3$, $t = 0.2$, $w = 0.1$, $\bullet = 0.1$ using Arithmetic coding. 10M
