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**R18**

Course Code: A30516

**CMR COLLEGE OF ENGINEERING & TECHNOLOGY****(UGC AUTONOMOUS)****B.Tech III Semester Supplementary Examinations August-2023****Course Name: OPERATING SYSTEMS****(Common for CSD, AID & AIM)****Date: 08.08.2023 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. Explain the importance of Real-Time systems. 2 M
2. List out any four Process Control System Calls. 2 M
3. When a process creates a new process, what is shared between parent process and child process? 2 M
4. Define Cooperating process. 2 M
5. What is Critical Section Problem? 2 M
6. Distinguish between counting and binary semaphores. 2 M
7. Write short note on demand paging. 2 M
8. Why are segmentation and paging sometimes combined into one scheme? 2 M
9. Write about Master File Directory in two-level directory structure. 2 M
10. List out the various file access methods. 2 M

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

- 11.A). Explain about operating system structures in detail. 10M
- OR**
11. B). Explain in detail about Time-shared and Real-time systems. 10M
12. A). Perform Non-Preemptive CPU scheduling algorithms on the given snapshot and analyze their performance: 10M

Process	Arrival Time	Burst Time
1	0	3
2	2	6
3	4	4
4	6	5
5	8	2

**OR**

12. B). Discuss about system call interface for process management. 10M
13. A). State and explain any two ways used for handling deadlocks. 10M
- OR**
13. B). Explain how Inter process communication is implemented by FIFOs and Message queues? 10M

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

14. A). What is page fault? Explain various steps involved to handle page fault in dynamic demand paging. 10M

**OR**

14. B). Given page reference string: 1, 2, 3, 2, 1, 5, 2, 1, 6, 2, 5, 6, 3, 1, 3, 6, 1, 2, 4, 3. Identify the number of page faults for LRU, FIFO and Optimal page replacement algorithms. Choose the best algorithm for the given reference string? 10M

15. A). Explain the following concepts with respect to file.  
i) Directory Structure, ii) Access Methods and iii) Protection. 10M

**OR**

15. B). Discuss in detail about the file allocation techniques: Sequential, Indexed and Linked. Highlight the advantages and limitations of each method? 10M

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H.T No:

**R18**

Course Code: A30511



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **DESIGN & ANALYSIS OF ALGORITHMS**

(Common for CSC & CSD)

Date: 10.08.2023 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. Define Theta Notation. 2 M
2. Find the recurrence equation for the worst case behavior of Merge Sort. 2 M
3. If  $f(n) = 5n^2 + 6n + 4$ , then show that  $f(n)$  is  $O(n^2)$ . 2 M
4. List the features of dynamic Programming. 2 M
5. State the principles of optimality. 2 M
6. Define state space tree. 2 M
7. Differentiate between live node and dead node. 2 M
8. Define branch and bound. 2 M
9. What is non deterministic algorithm? 2 M
10. What are different reduction techniques? 2 M

**PART-B**

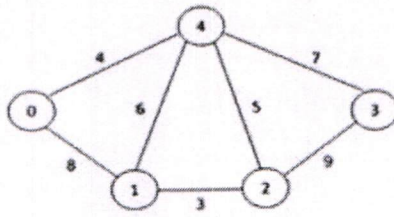
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What is an algorithm? What are the properties of an algorithm? Explain with an example. 10M
- OR**
11. B). Design an algorithm for checking whether all elements in a given array are distinct or not. Derive its worst time complexity. 10M
12. A). What is divide and conquer technique? Explain any one application of divide and conquer method with an example. 10M
- OR**
12. B). Compute the optimal solution for job sequencing with deadlines using greedy method.  $n = 4$ , profits  $(p_1, p_2, p_3, p_4) = (100, 10, 15, 27)$ , deadlines  $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$ . 10M
13. A). Solve the solution for 0/1 knapsack problem using dynamic programming  $(p_1, p_2, p_3, p_4) = (11, 21, 31, 33)$ ,  $(w_1, w_2, w_3, w_4) = (2, 11, 22, 15)$ ,  $m = 40$ ,  $n = 4$ . 10M
- OR**
13. B). Illustrate graph coloring problem with an example. 10M

(P.T.O..)

14. A). Show the shortest distance using All Pairs Shortest Path algorithm for the following graph. 10M



**OR**

14. B). Discuss about Depth First Search algorithm with an example. 10M

15. A). Compare NP-hard and NP-complete. 10M

**OR**

15. B). Explain control abstraction for LC search. 10M

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**R18**

Course Code: A36701



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

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **STATISTICAL FOUNDATIONS OF DATA SCIENCE**

(CSD)

Date: 12.08.2023 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 the need of correlation in statistical analysis? 2 M
2. Differentiate mean with median. 2 M
3. What is the use of A/B testing? 2 M
4. Data Quality is more important than Size. Justify your answer. 2 M
5. What tells a p-value in the statistical analysis? 2 M
6. What do you understand by Hypothesis testing? 2 M
7. Write the formulae for Multiple Linear Regression. 2 M
8. Differentiate prediction with profiling. 2 M
9. What is an Outlier? 2 M
10. Write the formulae for Linear Regression. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain about data distribution techniques with an example. 10M
- OR**
11. B). Explain about the estimates of variability. 10M
12. A). Explain different measures of Central limit theorem with a case study. 10M
- OR**
12. B). Explain a Student t- distribution with a case study. 10M
13. A). Explain Two- way ANOVA with an example. 10M
- OR**
13. B). Explain to test and f-test with an example. 10M
14. A). Illustrate Linear Regression with a case study. 10M
- OR**
14. B). Demonstrate stepwise Regression with an example. 10M
15. A). Explain in detail about Multi collinearity. 10M
- OR**
15. B). Explain Spline regression with an example. 10M

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**R18**

Course Code: A30509



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

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **DATABASE MANAGEMENT SYSTEMS**

(Common for CSE, IT, CSC, CSD & AID)

Date: 19.08.2023 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 a data model? List the types of data models used. 2 M
2. Define a) Entity b) Attribute 2 M
3. How can you alter and destroy tables? 2 M
4. Define Null Values. 2 M
5. State about SELECT operation in Relational algebra. 2 M
6. List out the Problems related to decompositions. 2 M
7. List the types of serializability. 2 M
8. Define time stamp. 2 M
9. What is an index? How is it useful in data base? 2 M
10. What is cluster indexes? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Compare File Processing system and DBMS. 10M
- OR**
11. B). Draw an E-R diagram for a banking enterprise with almost all components and explain. 10M
12. A). Illustrate Integrity constraint in relational model with appropriate examples. 10M
- OR**
12. B). Describe logical connectivity's of SQL. 10M
13. A). Discuss about Domain Relational calculus in detail. 10M
- OR**
13. B). Illustrate Multivalued dependencies and Fourth normal form with example. 10M
14. A). Explain ACID properties and Illustrate them through examples. 10M
- OR**
14. B). Describe Validation-based locking protocols. 10M
15. A). Write in detail about Hash based Indexing and Tree based Indexing. 10M
- OR**
15. B). What is B+ trees? Discuss about Dynamic Index Structure. 10M

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