

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

CLASS: BTECH  
BRANCH: AIML

SEMESTER : V/ADD  
SESSION : MO/2025

**SUBJECT: CS361 DATABASE SYSTEM CONCEPTS**

TIME: 3 Hours

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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		CO	BL
Q.1(a) Explain the detailed architecture of a DBMS system with a proper diagram.	[5]	1	3
Q.1(b) Why are integrity constraints required for DBMS? Discuss different integrity constraints with examples?	[5]	1	3
Q.2(a) State all the Codd's Rules.	[5]	2	2
Q.2(b) What is view? Discuss the problems that may arise when one attempts to update a view with proper examples.	[5]	3	1
Q.3(a) Discuss insertion, deletion, and modification anomalies. Why are they considered bad? Illustrate with examples.	[5]	2	3
Q.3(b) Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies $F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$ . What is the key for R? Decompose R into 2NF and then 3NF relations.	[5]	4	4
Q.4(a) Explain different types of single-level indexing techniques with examples.	[5]	5	2
Q.4(b) How does multilevel indexing improve the efficiency of searching an index file? Why is a B+ tree usually preferred as an access structure to a data file?	[5]	5	3
Q.5(a) Outline the significance of A C I D properties of a transaction. Draw a state diagram, and discuss the typical states that a transaction goes through during execution	[5]	1	4
Q.5(b) Which of the following schedules is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules.	[5]	5	5

- a.  $r_1(X); r_3(X); w_1(X); r_2(X); w_3(X)$
- b.  $r_1(X); r_3(X); w_3(X); w_1(X); r_2(X)$
- c.  $r_3(X); r_2(X); w_3(X); r_1(X); w_1(X)$
- d.  $r_3(X); r_2(X); r_1(X); w_3(X); w_1(X)$

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