4	Find the Minimal cover for the following FD set: {A→B, C→B, D-→ABC, AC-→D}	5	CO3
5	Given Relation R(ABCDEFGHIJ) and FD set {AB→C, A→DE, B→F, F→GH, D→IJ} decompose it into BCNF and check whether the decomposition is lossless or not, and dependency preserving or not?	5	CO3
6	Given Schedule S: $r_2(X) r_1(Y)\ r_1(Z)\ r_5(V)\ r_5(W)\ w_5(W)\ r_2(Y)\ w_2(Y)\ w_3(Z)\ r_1(U)\ r_4(Y)\ w_4(Y)\ r_4(Z)\ w_4(Z)$ $r_1(U)\ w_1(U)$ Check it the schedule is conflict serializable or not? Also write all possible sequences to execute schedule S.	5	CO4
7	Consider following transaction T1 with the following operations and explicit lock/unlock actions on data items X and Y. Is T1 following Two-Phase Locking (2PL)? If not, explain why and show the minimal change to make it 2PL-compliant. lock-S(T1,X) R1(X) unlock(T1,X) lock-X(T1,Y) W1(Y) unlock(T1,Y) commit T1.	5	CO4
8	Difference between Dense and Sparse Indexing with suitable example. In a database file structure, the search key field is 9 bytes long, the block size is 1024 bytes, the record pointer is 7 bytes and the block pointer is 6 bytes. The largest possible order of a non-leaf node in a B+tree implementing the file structure is.	5	CO5

**********END**********

Faculty Coordinators:

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MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

EXAMINATION: END TERM MONTH and YEAR: November 2025

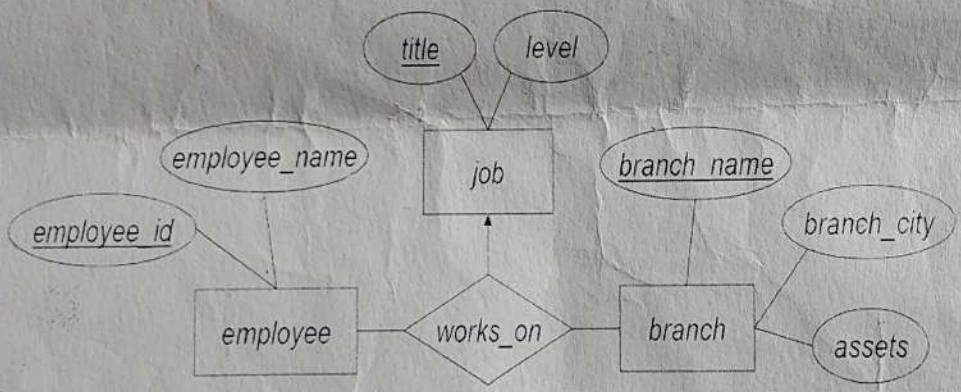
Name of the Student.. Nikil Jodhi **Scholar Number..** 2411201129

Course: B.Tech Semester: Third Subject Code: CSE 24212

Subject Name: Database Management Systems Maximum Marks: 40

Duration: 2: 00 Hours Date:19/11/2025 Time: 02:30 PM To 04:30PM

Note: All questions are compulsory.

Q. No	Questions	Marks	COs
1	a) Consider three entities: Project, Employee, and Department. A project is assigned to a department only when a specific employee recommends it. Explain why "recommendation" must be modeled with Aggregation and not a simple association. b) Using the given ER model, convert into relational schema:  	2+3	CO1
2	Using the following relational schemas, write the following queries in relational algebra. PATIENT(PID, Name) TREATMENT(PID, TreatmentID, Cost, Date, DoctorID) DOCTOR(DoctorID, DName, Specialization) a) find the name of patient who has been doing most expensive treatment. b) Find the name of the second most expensive treatment for the patient along with the doctor's name.	2+3	CO2
3	Write the syntax used to create a trigger. Consider a banking system with an Accounts table containing two fields: AccNo (Primary Key) and Balance (current account balance). Write a trigger that prevents withdrawal if the account balance goes below the minimum threshold. Minimum balance required: ₹3000.	5	CO2