

UNIVERSITY OF DELHI
DELHI-110007

CORRIGENDUM

Sl. No. of Q.P	:	6259
Unique Paper Code	:	2342573501
Name of the Paper	:	Database Management Systems
Course	:	B.A. (Prog)/B.Sc. (PS)/B.Sc. (MS)
Exam	:	10/12/2025 Evening
SEMESTER/YEAR	:	V
DURATION	:	3 Hour
Maximum Marks	:	90

Announcement for candidates

Sl. No. of paper be read as 6259.



Joint Registrar (Secrecy)

This question paper contains 7 pages.

Your Roll No.....

Unique Paper Code: 2342573501

Name of the Paper: **Database Management Systems**

Name of the Course: **B.A. (Prog.)/B.Sc. (PS)/B.Sc.(MS) (NEP-UGCF)**

Semester: **V**

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Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All parts of **Question 1 (Section A)** are compulsory.
3. Attempt **any four questions** from **Section B**.
4. All questions in Section B carry equal marks.
5. Parts of a question must be answered together.

Section A

- Q1 (a) What are the different types of database users? 3
- (b) Draw the symbols that are used in ER diagram for representing the following: 3
- Composite Attribute
 - Multivalued Attribute
 - Derived Attribute
- (c) Consider the following relational schema and identify the foreign keys: 3
- CUSTOMER**(Cust#, Cname, Phone, City)
ORDER(Order#, Odate, Cust#, OrderAmount)
ORDER_ITEM(Order#, Item#, Qty)
ITEM(Item#, ItemName, UnitPrice)
- (d) Consider the following table: 3
- | SID | SName | CourseID | CourseName | Instructor |
|-----|-------|----------|------------|------------|
| S1 | Raman | C101 | DBMS | Dr. Jain |
| S2 | Neha | C102 | OS | Dr. Sharma |
| S3 | Raman | C101 | DBMS | Dr. Jain |
| S4 | Amit | C103 | Networks | Dr. Rajat |
| S5 | Neha | C102 | OS | Dr. Sharma |
| S6 | Raman | C101 | DBMS | Dr. Puri |
- For the given relational state, check if the following functional dependencies exist or not:
- $SID \rightarrow SName$
 - $CourseID \rightarrow CourseName$
 - $CourseID \rightarrow Instructor$
- (e) Consider entity types DOCTOR and PATIENT. A doctor has DoctorID, DoctorName and Specialization. A patient has PatientID, PatientName and Disease as attributes. A doctor can treat at most one patient at a time while a patient can consult at most three doctors for a disease. How will you draw these entities in an ER diagram using (min, max) notation. 3
- (f) Consider the relation: 3
- COMPANY**(EmpID, EmpName, Dept, MonthlySalary).
 Write a command to create a view showing all employees of 'IT' department and their MonthlySalary > 30000.
- (g) Consider a Relation **R(A, B, C, D, E)** with following Functional Dependencies: 3

- (b) Consider the following tables:

WORKS(Pname, Cname, Salary)

LIVES(Pname, Street, City)

LOCATED_IN(Cname, City)

MANAGER(Pname, MgrName)

Where Pname = Person Name, Cname = Company Name, and MgrName = Manager Name

Write following queries in **SQL**:

- Give details of the persons who do not work for Big4 Companies (Deloitte, PwC, EY and KPMG).
- Find the company wise average salary.
- Write name of the persons who work in the company 'Amazon' along with the city they live in.
- Find the total number of persons working in each city.
- Write names of the persons who live and work in the same city.

iii) the number of file blocks, assuming an unspanned organization.

(b) Consider the following tables **CUSTOMER** and **ORDER**:

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CUSTOMER

<u>CustID</u>	Name	Mobile
C001	Anita	9910236788
C002	Mehak	9989237446
C003	Rohan	9987190346
C004	Sagar	9927143000
C005	Sujata	9951830058

ORDER

<u>OrderID</u>	<u>CustID</u>	Amount	Status
121	C001	3000	Pending
122	C002	6000	Delivered
123	C003	2300	Pending

Suppose the following operations are performed on the above tables. State whether it results in any constraint violation. If yes, state the violated constraint with reason:

- Insert < 'C004', 'Aman', '9938712009' > into **CUSTOMER**
- Insert < 124, 'C006', 1000, 'Pending' > into **ORDER**
- Delete tuple from **CUSTOMER** with Name 'Sujata'
- Insert < NULL, C001, 1500, 'Pending' > into **ORDER**
- Update the amount of **ORDER** tuple with **OrderID**=121 to 6000

Q7 (a) Consider the following schedule of transactions of T1 and T2 executing concurrently. Consider Balance = 1000 and Amount = 300.

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T1	T2
read_item(Balance)	
	read_item(Balance)
	Balance = Balance + Amount
	write_item(Balance)
Balance = Balance - 500	
write_item(Balance)	

- What will be the value of Balance after the completion of T1 and T2.
- Is it the correct value of Balance? If not then, what type of concurrency problem may occur?
- What should be the actual value of Balance?

FD1: $A \rightarrow BC$

FD2: $B \rightarrow D$

FD3: $CD \rightarrow E$

Find closure of A (A^+) and decide whether {A} is a candidate key or not. Give reason for your answer.

(h) Show the resulting relation after performing the **FULL OUTER JOIN** on the following relations **STUDENT** and **MARKS**:

3

STUDENT

<u>StudentID</u>	Name
101	Anuj
102	Meera
103	Kavita

MARKS

<u>StudentID</u>	Marks
102	90
103	75
104	68

- What is the significance of role names in the relationship? In what situations role names are essential?
- Define **ACID** properties in the context of a database transaction.

3

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Section B

- Q2 (a) Discuss five main advantages of using Database Management System. 5
- (b) Consider the following instance of a relation **PRODUCT_SUPPLIER**: 5

<u>ProductID</u>	ProductName	SupplierID	SupplierName	SupplierCity
PD1	Pen	SP1	Dell Stationers	Pune
PD2	Pencil	SP2	Om Stationers	Delhi
PD3	Eraser	SP2	Om Stationers	Delhi
PD4	Folder	SP3	HP Stationers	Mumbai
PD5	Sheets	SP2	Om Stationers	Delhi

Explain the kind of anomalies (if any) that may occur if we apply the following operations on the above table:

- Insert a new supplier (SP4, Golden Stationary, Delhi) who has not supplied any product yet.
- Delete the product PD3 as it is no longer needed.
- Supplier SP2 has moved from Delhi to Noida.
- Delete the product PD1.
- Insert a new product (PD5, Marker) whose supplier is not yet known.

- (c) In DBMSs where a clear distinction is maintained between the three levels, which of the DBMS LANGUAGES will be used to specify each of the following: 5
- To insert, delete and modify data
 - To retrieve data
 - To create user views
 - To specify conceptual schema
 - To add a new constraint to a table

Q3 (a) Explain three-schema architecture and draw a diagram. Why do we need mappings between schema levels? 5

(b) Draw an Entity Relationship diagram for the **Recording Studio** having the following requirements: 10

- Studio keeps records of each musician who come for recording. Musician has an ID number, name, an address (street, city) and more than one phone number.
- Studio has many instruments used for recording the songs. Each instrument has a unique name. Type of instrument is also stored.
- Each album recorded at the studio has a unique label, an album identifier and copyright date.
- Each song in the album has unique title and the name of the writer.
- A musician may play several instruments, and a given instrument may be played by many musicians.
- Every album has several songs on it, but a song may belong to only one album.
- A song may be performed by one or more musician. A musician may record several songs in the studio.
- An album is produced by a musician. A musician is allowed to produce only one album.

Please NOTE, the diagram should include entities, their attributes, keys, relationship between the entities, cardinality ratio and participation constraints.

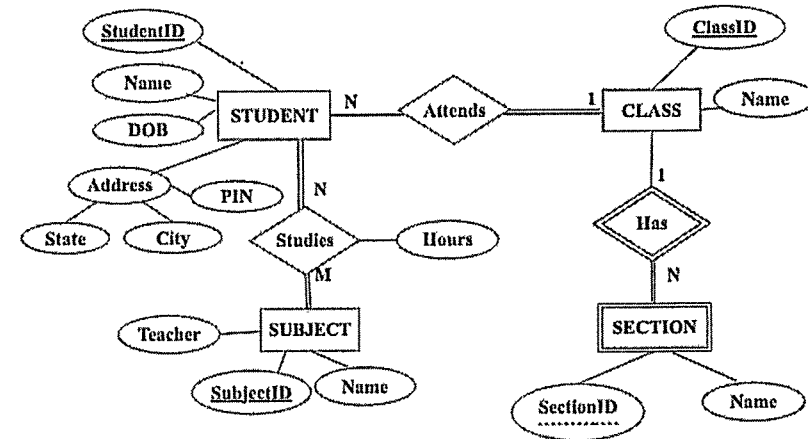
Q4 (a) Consider the following relations: 5

EMPLOYEE(EmpID, Name, DeptID, Salary)
DEPARTMENT(DeptID, DeptName, Location)

Write the following queries in **relational algebra**:

- List the details of all employees who earn more than 25000.
- List the name of all departments located in 'Delhi'.
- Give the average salary of all employees.
- List the name of employees who work in department number 101.
- Show EmpID, Name, DeptName and Location.

- (b) Consider the following ER diagram **UNIVERSITY**. Map the ER diagram into a relational schema. Identify relational tables, primary key and foreign key of each table. 10



Q5 (a) Find the left outer join and right outer join of the following tables: 5

EmpID	ENAME
E101	Manoj
E102	Meera
E103	Kavita
E104	Sagar
E105	Sujata

EmpID	Dname
E101	Finance
E102	Admin
E103	Accounts
E106	Research
E107	Library

(b) Consider the relation **SHIPPING** (Ship#, Capacity, Date, Cargo, Value) and the following set of functional dependencies: 10

FD1: Ship# → Capacity
 FD2: Ship#, Date → Cargo
 FD3: Cargo → Value

- Find the Primary key of the relation **SHIPPING**.
- State whether the relation is in 2NF or not. Give reason for your answer.
- Normalize the relation up to 3NF.

Q6 (a) Consider a disk with block size B=512 bytes. File has 20,000 records of employees. Each record has SSN (9 bytes), Name (30 bytes), Dnumber (9 bytes), and Sex (1 byte). An additional byte is used as a deletion marker. The block pointer P is 6 bytes long. Calculate the following: 5

- the record size in bytes,
- the blocking factor