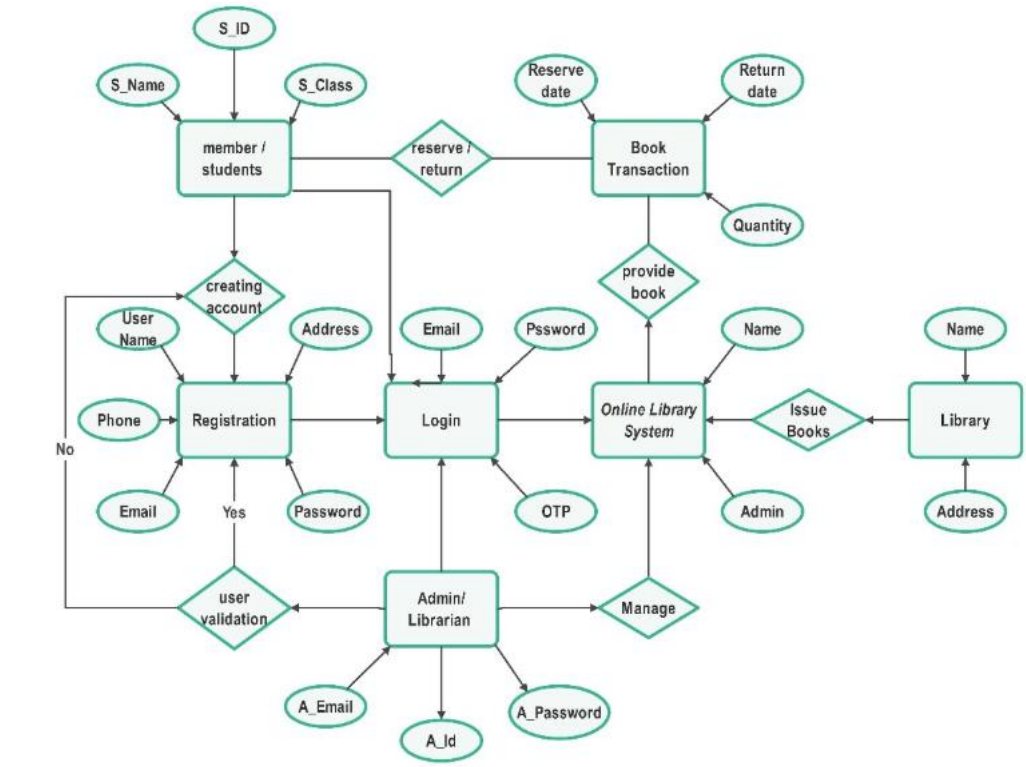
(Affiliated to University of Mumbai)	***End Semester Examination (R-24/R-25) SH 2026 Answer Key with marking scheme***
Branch: CE/AIML/AIDS	Course: Database Management Systems
Year/ Semester: SE III	Course code(CEC304/DSC304/AIMLC304
Time: 03 hours	Marks: 80

		Marks
Q. 1	All questions are compulsory.	
A.	Diffrentiate based on sorage retrieval ease and example 5M	05
B.	Minimum no. of Relations Patient Medical Doctors Tests Logs Qualification Show with proper attributes and references	05
C.	Domain Constraints: Check ,Null and Unique constraint Key Constraints :Primary Key ,Foriegn Key Referential integrity constraints:Foreign key consraint Give example of each	05
D.	Describe insertion deletion and update anomaly by taking unnormalized table as an example	05
E.	Wait-Die Scheme :2M Wound wait scheme 2 M Difference between them 1M	05
F.	Following points for evaluation • A cloud database is a database that runs on a cloud computing platform, offering benefits like o scalability, o accessibility, and o managed services instead of requiring on-premises hardware and software. • **The design process involves** o understanding requirements, o designing the conceptual, logical, and physical database structures, o implementing the database, and o performing testing and o ongoing maintenance to ensure ▪ data integrity, ▪ security, and performance in the cloud environment	05

Q.2A		10
	OR	
Q.2B.	EER is a high-level data model that incorporates the extensions to the original **ER model**. Enhanced ERD are high level models that represent the requirements and complexities of complex database. 1 M Subclasses and Super classes. Specialization and Generalization. Category or union type. Aggregation. Along with diagrammatic example 1 M each	10
Q.3A	(i) SELECT Dept_Name, SUM(Budget) AS Total_Budget FROM PROJECT GROUP BY Dept_Name; (2) (ii) UPDATE PROJECT SET Dept_Name='Development' WHERE Duration < 6; (2) (iii) CREATE VIEW project_record AS SELECT Project_ID, Project_Name, Budget FROM PROJECT; (2) (iv) SELECT * FROM PROJECT ORDER BY Budget DESC; (2) (v) GRANT SELECT ON PROJECT TO user1; REVOKE SELECT ON PROJECT FROM user1; (2)	10
	OR	
Q.3B	**Find total number of people who owned cars that are involved in accidents in 2004.** SELECT COUNT (DISTINCT name) FROM Accident, Participated, Person WHERE Accident.report_no= Participated.report_no AND Participated.driver id = Person.driver id AND date BETWEEN DATE '2004-00-00' and DATE '2004-12-31' **ii. Find the number of accidents in which car belonging to 'John Smith' were involved.** SELECT count (distinct *) FROM Accident WHERE exists	10

	(SELECT * FROM Participated, Person WHERE Participated.driver_id= Person.driver_id AND Person.name= “John Smith” AND Accident.report_no= Participated.report_no) **iii. Add new accident to Database** INSERT INTOAccident VALUES(9001, ‘2015-09-14’, ‘abc’) INSERT INTO Participated SELECT o.driver_id, c.license, 9001, 2500 FROM Personp, Ownso, Carc WHERE p.Name= ‘xyz’ AND p.Driver_id= o.driver_id AND o.license= c.license AND c.model= ‘abc’ **iv. Delete ‘Santro’ belonging to ‘John Smith’** DELETE Car WHERE model = ‘Mazda’ AND license IN (SELECT license FROM Person p, Owns o WHERE p.name = ‘John ’ AND p.driver_id = o.driver_id) V) UPDATE Participated SET damage_amount = 3500 WHERE car = 'AABB2000' AND report_no = 'AR2197';	
Q.4A	For simplicity and better understanding, we can represent the given schedule pictorially as- · We know, if a schedule is conflict serializable, then it is surely view serializable. · So, let us check whether the given schedule is conflict serializable or not. Checking Whether S is Conflict Serializable Or Not- Step-01: List all the conflicting operations and determine the dependency between the transactions- · R1(A) , W2(A) (T1 → T2) · R1(A) , W3(A) (T1 → T3) · W2(A) , R3(A) (T2 → T3) · W2(A) , W1(A) (T2 → T1) · W2(A) , W3(A) (T2 → T3) · R3(A) , W1(A) (T3 → T1) · W1(A) , W3(A) (T1 → T3) Step-02: Draw the precedence graph- T1 T2 T3 R(X) W(X) R(X) W(X) W(X) · Clearly, there exists a cycle in the precedence graph. · Therefore, the given schedule S is not conflict serializable. Now, · Since, the given schedule S is not conflict serializable, so, it may or may not be view serializable. · To check whether S is view serializable or not, let us use another method. · Let us check for blind writes. Checking for Blind Writes- There exists a blind write W2 (A) in the given schedule S. · Therefore, the given schedule S may or may not be view serializable. Now, · To check whether S is view serializable or not, let us use another method. · Let us derive the dependencies and then draw a dependency graph. Drawing a Dependency Graph- · T1 firstly reads A and T2 firstly updates A. · So, T1 must execute before T2. · Thus, we get the dependency T1 → T2. · Final updation on A is made by the transaction T3. · So, T3 must execute after all other transactions. · Thus, we get the dependency (T1, T2) → T3. · From write-read sequence, we get the dependency T2 → T3 Now, let us draw a dependency graph using these dependencies- · Clearly, there exists no cycle in the dependency graph. · Therefore, the given schedule S is view serializable. The serialization order T1 → T2 → T3.	10
	OR	

Q.4B	Differentiate based on time for storage, rollback and commit operation and the data stored at any point of time.	05
	Define atomicity integrity,consistenct and durability 4 M Example of transaction ensuring these properties 1 M	05
Q.5A	Find all the tuples from Movies for actor name as Tom Cruise σ Name="Tom Cruise"(Movies) 2. Select all the tuples for which Awards are greater than or equal to 5. σ Awards >= 5(Movies) 3. List all actor ID and countries in Movies relation. Π ActID, Country(Movies) 4. Rename Movies relation to Cinemas ρ Cinemas (Movies) 5. Select all the actors whose networth are more than or equal to $100 Million and age is less than 50. σ Networth >= 100 and age < 50.	05
	Differentiate between 3 NF and BCNF . Give examples of both	05
	OR	
Q.5B	Explain 5 relational algebra operators with syntax and example query 1 M each	05
	Book (Title, Author, Catalog_no, Publisher, Year, Price, bookCoverType, contractDate) **Collection** (Title, Author, Catalog_no). Assume {Author, Title} is the key for both relations. Additional functional dependencies are :- 1. Title,Author --> Catalog_no 2. Catalog_no --> Publisher, Year, bookCoverType 3. Publisher, bookCoverType --> Price 4. Author --> contractDate a. Explain what normal form the relation is in. b. Apply normalization until the 3rd NF. State reasons behind each normalization. **Answer:** a. It's in 1 NF, because no multi valued/composite attribute and no nested relations. b. It is not in 2NF as there is partial dependency due to FD IV. Therefore, normalizing to 2NF: Collection (Title,Author,Catalog_no) Book (Title, Author, Catalog_no, Publisher, Year, Price, bookCoverType) Author_Info(Author, ContractDate) Now normalizing to 3NF as there is still transitive dependency in "Book" table due to Fd II and III. Collection (Title,Author,Catalog_no) Author_Info(Author, ContractDate) Book (Title, Author, Catalog_no) Catalog (Catalog_no, Publisher, year, bookcovertype)	05
Q.6A	Conventional databases are limited by their :- • high costs, • complexity, • poor scalability, • inability to handle unstructured data, • fixed schema, and • potential for performance issues and data redundancy.	04
	Describe Trigger with example. Define trigger and its use 2M Syntax 2M	06

	Example 2M		
	Explain Left, Right, Full outer join with example. Types of Outer Join with syntazx and application 3 M Example of each 3 M		
	OR		
Q.6B	Explain the key data types in multimedia databases, such as images and videos, with examples. 1. Static Media (Time-Independent): • Images, graphics,objects,text 2. Dynamic Media (Time-Dependent): • Video,Audio,Animation 3. Dimensional Media: • 3D Objects/Models: 4. Associated Metadata:		04
			06

*********** All the Best***********