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SKIT	Teaching Process	Rev No.: 1.0
oc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
Title:	Course Plan	Page: 1 / 22

# Table of Contents

15CS53 : Database Management System	2
A. COURSE INFORMATION	
1. Course Overview	2
2. Course Content	2
3. Course Material	
4. Course Prerequisites	
B. OBE PARAMETERS	4
1. Course Outcomes	4
2. Course Applications	
3. Articulation Matrix	
4. Mapping Justification	5
5. Curricular Gap and Content	8
6. Content Beyond Syllabus	8
C. COURSE ASSESSMENT	8
1. Course Coverage	
2. Continuous Internal Assessment (CIA)	8
D1. TEACHING PLAN - 1	9
Module - 1	
Module – 2	
E1. CIA EXAM – 1	
a. Model Question Paper - 1	
b. Assignment -1	
D2. TEACHING PLAN - 2	
Module – 3	
Module – 4	
E2. CIA EXAM – 2	
a. Model Question Paper - 2	
b. Assignment – 2	
D3. TEACHING PLAN - 3	
Module – 5	
E3. CIA EXAM – 3	
a. Model Question Paper - 3	
b. Assignment – 3	
F. EXAM PREPARATION	
1. University Model Question Paper	
2. SEE Important Questions	

Note : Remove "Table of Content" before including in CP Book

Each Course Plan shall be printed and made into a book with cover page

Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 2 / 22

# 15CS53 : Database Management System

### A. COURSE INFORMATION

### 1. Course Overview

Degree:	B.E	Program:	CS
Year / Semester :	V	Academic Year:	2018-19
Course Title:	Database Management System	Course Code:	15CS53
Credit / L-T-P:	4-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	50	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	1 / Module
Course Plan Author:	Chandana L S	Sign	Dt:
Checked By:		Sign	Dt:

#### 2. Course Content

Mod	Module Content	Teaching	Module	Blooms
ule		Hours	Concepts	Level
1	Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.	10	Storage of data and Entity relationship	L3, L3
2	Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping. SQL:SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	10	Relational algebra and query language	L3, L3
3	SQL:Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. Database Application Development: Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop. Internet Applications:The three-Tier application architecture, The presentation layer, The Middle Tier	10	SQL and database connectivity	L3, L4
4	Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms,Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form,Join Dependencies and Fifth NormalForm.Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms	10	Database design and Normalization	L3, L4

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SKIT		SKIT	Teaching Process		Rev No.: 1.	0	
Doc Code:		Doc Code:	SKIT.Ph5b1.F02		Date: 03-08-2018		
	CARGENSO		Title:	Course Plan		Page: 3 / 2	22
1	Copyright ©	2017. cĂ	AS. All rights reserved	d.		•	
	5 Tr	ransa	ction Proces	sing: Introduction to Transaction Processing,	10	Transaction	L5, L5
	Transaction and System concepts, Desirable properties of			processing			
	Transactions, Characterizing schedules based on recoverability,				and data		
Characterizing schedules based on Serializability, Transaction		transaction					
support in SQL. Concurrency Control in Databases: Two-phase		and recovery					
		مارامه	* toobaiques	for Concurrency control Concurrency		mathada	

locking techniques for Concurrency control, Concurrency	methods	
control based on Timestamp ordering, Multiversion		
Concurrency control techniques, Validation Concurrency		
control techniques, Granularity of Data items and Multiple		
Granularity Locking. Introduction to Database Recovery		
Protocols: Recovery Concepts, NO-UNDO/REDO recovery		
based on Deferred update, Recovery techniques based on		
immediate update, Shadow paging, Database backup and		
recovery from catastrophic failure.		

### 3. Course Material

Mod	Details	Available
ule		
1	Text books	
	Database systems Models, Languages, Design and Application Programming,	In Lib
	Database management systems, Ramakrishnan, and Gehrke, 3 rd Edition, 2014, McGraw Hill	
2	Reference books	
	Silberschatz Korth and Sudharshan, Database System Concepts, 6 th Edition, Mc-GrawHill, 2013.	In dept
	Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.	
3	Others (Web, Video, Simulation, Notes etc.)	
	http://nptel.ac.in/courses.php?disciplineID=111	Available

### 4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	15CS53	Database Management System	1. Knowledge on Software life cycle basics	4	Knowledge on software and stages of life cycle	L2
			2. Datastructure and algorithms	3	Knowledge on basics of programming	L3
			3. Primary memory and Secondary memory	3	Knowledge on data storage and access	L2

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

SKIT	Teaching Process	Rev No.: 1.0
Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
Title:	Course Plan	Page: 4 / 22

### B. OBE PARAMETERS

### 1. Course Outcomes

#	COs	Teach.	Concept	Instr	Assessme	Blooms'
		Hours		Method	nt	Level
					Method	
-	Student should be able to	-	-	-	-	-
15CS53.1	Understand the importance of	05	Storage of	Discussion	Slip test	L2
	Database management system in real time.		data			Understand
15CS53.2	Identify methodology of conceptual	05	Entity	Lecture	Q&A	L3
	modeling through Entity relationship model		relationship			Apply
15CS53.3	Apply the relational model concepts	05	Relational	Description	Assignme	L3
	and operations for optimizing queries in RDBMS.		Algebra		nt	Apply
15CS53.4	Apply the SQL commands for	05	Query	Develope	Employee	L3
	creating tables in database schema.		Language		Problem	Apply
			601		set	
150553.5	Apply the triggers and views in	05	SQL	solve	Focused	L3 Apply
					analyzing	Арріу
					/compare	
15CS53.6	Analyze the access methods to store	05	Data	Examine	Demonstr	L4
	the data through internet application		connectivity		ate	Analyze
15CS53.7	Apply the normalization techniques	04	Database	Demonstra	Quiz	L3
	to normalize the database using		design	tion		Apply
	mathematical modelling					
15CS53.8	Analyze the different types of	06	Normalizatio	lutorial	Analyze	L4
	algorithm using database design		n			Analyze
1505520	Demonstrate the transaction and	05	Transaction	Drocontatio	Sominar	15
190003.9	query processing	05	process	n	Serrinai	⊑o Evaluate
15CS53.10	Analyze and implement the	05	Data	Method/	Student	L5
-0 00	concurrency control and database		transaction	procedure	analyze /	Evaluate
	recovery protocols in database		and		focuses	
			recovery			
			methods			
-	Total	50	-	-	-	-

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

### 2. Course Applications

SNo	Application Area	CO	Level
1	Usage of database in different areas like banking , e-commerce , organization	CO1	L2
2	Understand and apply the concept of conceptual modelling to design a database	CO2	L3
3	Use relational model for optimizing queries	CO3	L3
4	Usage of Structured query language commands in creating database tables	CO4	L3
5	Creation of schema using triggers and views	CO5	L3
6	Accessing the database for various internet applications	CO6	L4
7	Using mathematical modelling techniques for normalization	CO7	L3
8	Understanding the normalization algorithms for database design	CO8	L4
9	Applying the characterizing schedules for transaction processing	CO9	L5
10	Understand the concurrency control techniques and database recovery protocols	CO10	L5
Mata	VV/rite 4 ex 2 explications per CO		

Note: Write 1 or 2 applications per CO.

(Contraction)	
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SKIT	Teaching Process	Rev No.: 1.0
Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
Title:	Course Plan	Page: 5 / 22

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#### (CO – PO MAPPING)

-	Course Outcomes	Program Outcomes												
#	COs	PO1	PO2	PO3	PO4	PO5	PO	PO7	PO8	PO9	PO1	PO1	PO1	Level
							6				0	1	2	
15CS53.1	Understand the importance of Database management system in real time.	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L2 Unde rstan d
15CS53.2	Identify methodology of conceptual modeling through Entity relationship model	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L3 Apply
15CS53.3	Apply the relational model concepts and operations for optimizing queries in RDBMS.	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L3 Apply
15CS53.4	Apply the SQL commands for creating tables in database schema.	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L3 Apply
15CS53.5	Apply the triggers and views in database schema.	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L3 Apply
15CS53.6	Analyze the access methods to store the data through internet application	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L4 Analy ze
15CS53.7	Apply the normalization techniques to normalize the database using mathematical modelling	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L3 Apply
15CS53.8	Analyze the different types of algorithm using database design theory for different applications	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L4 Analy ze
15CS53.9	Demonstrate the transaction and query processing	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L5 Evalu ate
15CS53.10	Analyze and implement the concurrency control and database recovery protocols in database	2.5	2.5	2.5	-	2.5	-	-	-	2.5	2.5	2.5	2.5	L5 Evalu ate

### 4. Mapping Justification

Mapping		Justification	
CO	PO	-	-
CO1	PO1	Knowledge of using database management is required to use it in areas like ebanking , ecommerce etc.	L3, L6
CO1	PO2	Understanding database systems is required to identify and analyze complex problems	L2 , L4, L5, L6
CO1	PO3	Learning of database systems is required to design and develop solution to complex problems	L4 , L6
CO1	PO4	Investigation of complex problems of database management requires basic understanding of database systems	L3 , L4
CO1	PO5	To develop appropriate techniques , tools , understanding of database management system is required	L2
CO1	PO10	Applying the knowledge gained about using database in real time systems is required to communicate complex engineering activities	L2 , L3
CO2	PO1	Knowledge of conceptual modelling through entity relationship model is required to design database simple to complex database	L3

1	Second Con	
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	( Second Second	SKIT	Teaching Process	Rev No.: 1.0
		Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 6 / 22	
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		problems	
CO2	PO2	Analysing problems of database requires knowledge on conceptual modelling	L3 , L4
CO2	PO3	To design solution to database problems requires learning of entity relationship model	L4 , L6
CO2	PO4	Research based knowledge required to interpret data in design of ER diagram	L4 ,L5, L6
CO2	PO5	Knowledge of ER modelling is required in design of modern tools like SQL	L3
CO2	PO9	To develop ER diagrams specific to different databases individual students should have knowledge of ER modelling	L3
CO2	PO11	To solve complex database problems and develop real time projects knowledge of conceptual modelling is required	L4
C03	PO1	Knowledge of relational model concepts is required for query optimization	L3
C03	PO2	To analyze query optimization knowledge of relational model concept is required	L4
C03	PO3	To design various RDBMS , understanding of relational model concept is required	L6
CO3	PO4	Research based knowledge required to interpret data in process of optimization of queries	L4
CO3	PO5	Knowledge of relational algebra is required in design of modern tools like SQL	L3
CO3	PO9	To design queries specific to different databases retrievals individual students should have knowledge of relational algebra	L3
CO3	PO11	To solve complex database problems and develop real time projects , knowledge of query optimization is required	
CO4	PO1	Knowledge of basic SQL is required for creation of DB	L2,L3
CO4	PO2	Understanding the usage of SQL commands is required to analyze when complex tables been created	L2,L3,L4
CO4	PO3	D3 Learning of basic SQL and its uswage is required to design and develop a complex database	
CO4	PO5	To create a DB appropriate techniques , tools are required in a database systems	L2, L3,L4,L6
CO4	PO9	To design queries specific to different databases retrievals individual students should have knowledge of query language	L3
CO4	PO11	To solve complex database problems and develop real time projects , knowledge of query language is required	L5
CO5	PO1	Knowledge of views and triggers is required to give solution to complex DB problems	L2,L3
CO5	PO2	Analyzing the DB schema for complex problems requires the knowledge of triggers and views	L3,L4,L6
CO5	PO3	To design the solution for a DB problems, understanding triggers and view is required.	L3,L4,
CO5	PO4	PO4 Research based knowledge required to analyze the data using views and triggers	
CO5	POg To design queries specific to different databases retrievals , individual students should have knowledge of using views and triggers		L5
CO5	PO11	11 To solve complex database problems and develop real time projects , knowledge of views and triggers is required	
CO6	PO1	Knowledge of access methods is required to store data through internet applications	
CO6	CO6 PO2 Access methods knowledge is required to analyze data storage problems.		L2, L4
CO6	PO3	To design and develop access methods to store the data knowledge of analyzing the access methods for different	L3

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	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
C. COLORIS	Title:	Course Plan	Page: 7 / 22
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		applications is required	
CO6	PO4	Research based knowledge is required to model the different applications which use access methods to store the data	L4
CO6	PO5	Knowledge of data connectivity is required in design of modern tools like SQL	L2
CO6	PO9	To develop different solutions specific to different databases individual students should have knowledge of data connectivity	L3
CO6	PO11	To develop different database applications ,knowledge of data connectivity is required	
CO7	PO1	Knowledge of normalization is required to give accurate solution to complex DB problems	L2
CO7	PO2	Analysis of complex DB solution requires understanding of normalization	L2, L4
CO7	PO3	Design the solution of DB problems requires normalization	L3, L4
CO7	PO5	Knowledge of data normalization is required in design of modern tools like SQL	L3
CO7	PO9	To design different databases individual students should have knowledge of data normalization	L3
C07	PO11	To develop different database applications ,knowledge of data normalization is required	L3
CO8	PO1	Knowledge of normalization algorithm is required in designing of DB	L2,L3
CO8	PO2	To review research solution to DB problems requires require knowledge of normalization algorithm	L2, L4
CO8	CO8 PO3 Design solution to complex DB problems requires understanding of normalization algorithm		L4, L6
CO8	PO4 Research based knowledge is required to analyze different types of algorithms using database design theory		L2
CO8	PO5	PO5 Knowledge of algorithm analysis is required to develop modern tools like SQL	
CO8	PO9	PO9 To design different databases individual students should have knowledge of algorithm analysis	
CO8	PO11	To develop different database applications ,knowledge of algorithm analysis is required	L4
CO9	PO1	Basics of transaction processing is required to demonstrate it	L2
CO9	PO2	To analyze transaction properties knowledge of acid properties is required	L3
CO9	PO3	To design and develop a database the knowledge of transaction processing is required	L4
CO9	PO4	Research based knowledge is required to solve complex problems related to transaction processing	L2
CO9	PO5	Knowledge of transaction processing is required to design modern tools like SQL	L4
CO9	PO12	Knowledge of transaction processing is required to use different database applications	L2
C010	D10     PO1     In case of transaction failures knowledge of recovery techniques is required		L2
C010	PO2	To analyze the issue of transaction failure the knowledge of concurrency control is in need	
C010	PO3	To develop a solution for the transaction failures the knowledge of recovery techniques is required	
C010	PO4	To overcome the transaction failures the investigation with some recovery techniques is in need	L4
CO10	POg To recover from databases failures , individual students should have knowledge of implementing recovery protocols		L3
CO10	PO11	To design solution to complex database problems knowledge of analyzing and implementing concurrency control is in need	L4

Note: Write justification for each CO-PO mapping.

Contraction of the second	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 8 / 22

#### 5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

#### 6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Note: Anything not covered above is included here.

### C. COURSE ASSESSMENT

#### 1. Course Coverage

Mod	Title	Teaching		No. of	f quest	ion in	Exam		CO	Levels
ule		Hours	CIA-1	CIA-2	CIA-3	Asg	Extra	SEE		
#							Asg			
1	Introduction to database	10	2	-	-	1	1	2	CO1,	L2, L3
									CO2	
2	Relational model	10	2	-	-	1	1	2	CO3,	L3, L3
									CO4	
3	SQL	10	-	2	-	1	1	2	CO5,	L3, L4
									CO6	
4	Normalization	10	-	2	-	1	1	2	CO7,	L3, L4
									C08	
5	Transaction processing	10	-	-	4	1	1	2	CO9,	L5, L5
									CO10	
-	Total	50	4	4	4	5	5	10	-	-

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

#### 2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	СО	Levels
CIA Exam – 1	15	CO1, CO2, CO3, CO4	L2, l3, l3, l3
CIA Exam – 2	15	CO5, CO6, CO7, Co8	L3, L4, L3, L4
CIA Exam – 3	15	CO9, CO10	L5, L5

(Sameran	SKIT	Teacl	Rev No.: 1.0		
	Doc Code:	SKIT.Ph5b1.F02		Date: 03-08-2018	
Concold I	Title:	Course Plan		Page: 9 / 22	
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Assignment	- 1	05	CO1, CO2, CO3, CO4	L2, l3, l3, l3	
Assignment	- 2	05	CO5, CO6, CO7, CO8	L3, L4, L3, L4	
Assignment	- 3	00	-	-	
Seminar - 1		00	_	-	
Seminar - 2		00	-	-	
Seminar - 3		05	CO9, CO10	L5, L5	
Other Activities – define –			-	-	
Slip test					
Final CIA Marks		20	-	-	

Note : Blooms Level in last column shall match with A.2 above.

### D1. TEACHING PLAN - 1

### Module - 1

Title:	Introduction to database	Appr Time	16 Hrs
а	Course Outcomes	-	Blooms
-	The student should be able to:	_	Level
1	Understand the importance of Database management system in real time.	CO1	L2
2	Identify methodology of conceptual modeling through Entity relationship	CO2	L3
	model		<u> </u>
b	Course Schedule	-	-
Class No	o Module Content Covered	CO	Level
1	Introduction to Databases: Introduction,	C01	L2
2	Characteristics of database approach	C01	L2
3	Advantages of using the DBMS approach	C01	L2
4	History of database applications	C01	L2
5	Overview of Database Languages and Architectures: Data Models,	C01	L2
	Schemas, and Instances.		
6	Three schema architecture and data independence, database	C01	L2
	languages, and interfaces		
7	The Database System environment. Conceptual Data Modelling using	CO2	L3
	Entities and Relationships: Entity types, Entity sets, attributes, roles, and		
	structural constraints, Weak entity types, E R diagram	000	
8	examples, Specialization and Generalization.	CO2	L3
	Application Areas	<u> </u>	
C 1	Application Areas		
	organization	COI	L2
2	Understand and apply the concept of conceptual modelling to design a	CO2	L3
	database		
d	Review Questions	-	-
1	What is the difference between a database schema and a database state?	CO1	L2
2	What is the difference between logical data independence and physical data independence? Which one is harder to achieve and why?	CO1	L2
3	What is the role of pre compiler in a DBMS environment?	CO1	L2
4	What is the difference between two tier and three tier client/server	CO1	L2
	architectures?		
5	What do you understand by "degree of a relationship type"? Explain with	CO2	L3

(Samera)	SKIT	Teaching Process	Rev No.: 1.0					
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018					
	Title:	Course Plan	Page: 10 / 22					
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	example.		
6 L	under what conditions can an attribute of a binary relationship type be migrated to become an attribute of the participating entity types?	CO2	L3
7	Discuss the naming conventions used for ER schema diagrams.	CO2	L3
е	Experiences	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

### Module – 2

Title:	Relational model	Appr Time:	10 Hrs
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Apply the relational model concepts and operations for optimizing queries in RDBMS.	CO3	L3
2	Apply the SQL commands for creating tables in database schema.	CO4	L3
h	Course Schedule		
Class No	Module Content Covered	СО	Level
1	Relational Model Concepts, Relational Model Constraints	CO3	L3
	and relational database schemas, Update operations, transactions, and dealing with constraint violations.	-	
2	Relational Algebra: Unary and Binary relational	CO3	L3
	operations,		
3	additional relational operations (aggregate, grouping, etc.)	CO3	L3
4	Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping.	CO3	L3
5	SQL: SQL data definition and data types	CO4	L3
6	specifying constraints in SQL, retrieval queries in SQL INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	CO4	L3
7	retrieval queries in SQL	CO4	L3
8	INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.	CO4	L3
с С	Application Areas	0.0	Level
1	Use relational model for optimizing queries	CO3	
2	Usage of Structured query language commands in creating database tables	CO4	L3
d	Review Questions	-	-
12	Why are duplicate tuples not allowed in a relation?	CO3	L3
13	What is the difference between candidate key, primary key and unique key?	CO3	L3
14	Discuss the various reasons that lead to the occurrence of NULL values in relations?	CO3	L3
15	What are the rules that must be satisfied by the foreign key?	CO4	L3
16	Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course: STUDENT ( <u>Ssn</u> ,Name,Major,Bdate) COURSES( <u>Course#</u> ,Cname,Dept) ENROLL( <u>Ssn,Course#</u> , <u>Quarter</u> , Grade)	CO4	L3

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	Doc Code:	SKIT.Ph5b1.F02	Date: 03	-08-2018					
Concession of the second secon	Title:	Course Plan	Page: 11	/ 22					
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	BOOK_ADOPTION( <u>Course#,Querter</u> ,Book_isbn) TEXT( <u>Book_isbn</u> ,Book_title,Publisher,Author)		
е	Experiences	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

# E1. CIA EXAM – 1

# a. Model Question Paper - 1

Crs Code:		15CS53	Sem:	5	Marks:	20	Time: 8	80 minute	es	
Course: Database Management System										
-	-	Note: Ansv	ver any 2 qu	lestions, ead	ch carry eo	qual marks.		Marks	со	Level
1	а	What is the difference between logical data independence and physical data independence? Which one is harder to achieve and why?							CO1	L2
	b	Discuss the from traditi	e main chara onal file sys	acteristics of tems	f database	approach a	and how it diffe	rs		L2
	С	Describe tl among sch	he three sc ema levels?	hema archil	tecture . V	Vhy do we	need mapping	js		L2
	d	Define the internal s independe sublanguaç	following te schema, c nce,DDL, DN ge, <i>database</i>	rms: <i>data m</i> o onceptual ML, SDL, VD e utility, cata	odel, datal schema, L, query la log	oase schemo external nguage, hos	a, database stat schema, da st language, da	e, ta ta		L2
2	а	What is a weak entity type? Explain the role of partial key in design of weak entity type.						20	CO2	L3
	b	What do yo example.	ou understa	nd by "degr	ee of a rel	ationship typ	pe"? Explain wi	:h		L3
	С	Define an e occur in a E	entity or attr ER diagram	ibute . Expla model with e	ain the diffe example	erent types	of attributes th	at		L3
	d	Draw an ER diagram for a BANK database schema with at least five entity types. Also specify primary key and structural constraints.						У		L3
3	а	Consider t student en STUDENT ( COURSES( <u>(</u> ENROLL( <u>Se</u> BOOK_AD( TEXT( <u>Book</u>	he followin rollment in ( ( <u>Ssn</u> ,Name,1 <u>Course#</u> ,Cn <u>sn,Course#</u> , DPTION( <u>Cou</u> :_isbn,Book_	g relations courses and Major,Bdate) ame,Dept) <u>Quarter</u> , Gra <u>Irse#,Querte</u> title,Publish	for a dat the books ade) er,Book_ist er,Author)	abase that adopted for on)	keeps track of each course:	of 20	CO3	L3
	b	What is the key?	e difference	between c	andidate k	key, primary	key and uniqu	le		L3
	С	Explain the	relational a	lgebra opera	ations from	n set theory	with examples			L3
	d	How are t operations	he OUTER ? How is the	JOIN opera OUTER UN	ations diffe ION opera	erent from t tion differen	the INNER JOI t from UNION ?	N		L3
4	a	Consider t student en STUDENT (	he followin rollment in ( ( <u>Ssn</u> ,Name,N	g relations courses and Major,Bdate)	for a dat the books	abase that adopted for	keeps track of each course:	of 20	CO4	L3

	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 12 / 22

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		COURSES( <u>Course#</u> ,Cname,Dept)		
		ENROLL( <u>Ssn,Course#, Quarter</u> , Grade)		
		BOOK_ADOPTION( <u>Course#,Querter</u> ,Book_isbn)		
		TEXT( <u>Book_isbn</u> ,Book_title,Publisher,Author)		
	b	In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example.		L3
	С	Consider the following RESORT database RESORT (resort no, resort name, resort type, resort addr, resort city, numsuite) SUITE( suit no, resort no, suite price) RESERVATION(reservation no, resort no, visitor no, check in, check out, totoal visitors, suite no) VISITOR(visitor no, firstname, lastname, visiter addr) 1) write the sql to list full details of all the resorts on los angeles 2) write the sql list full details of all the resorts having number of suits more than 30) 3) write the sql to list visitor in ascending order by firstname.		L3
	d	Discuss how NULL s are treated in comparison operators in SQL. How are NULL s treated when aggregate functions are applied in an SQL query? How are NULL s treated if they exist in grouping attributes?		L3

### b. Assignment -1

Note: A distinct assignment to be assigned to each student.

	Model Assignment Questions									
Crs C	ode:	15CS53	Sem:	5	Marks:	5 / 10	Time:	90 - 120	minute	S
Cours	Course: Database Management System									
Note:	lote: Each student to answer 2-3 assignments. Each assignment carries equal mark.									
SNo	l	JSN		As	signment De	scription		Marks	СО	Level
1			Define the following terms: <i>data model, database schema,</i> 5 <i>database state,</i> internal schema, conceptual schema, external schema, data independence,DDL, DML, SDL, VDL, query language, host language, data sublanguage, <i>database utility,</i> <i>catalog, client/server architecture, three-tier architecture,</i> and n-tier architecture.						CO1	L2
2			Draw an ER least five en constraints.	diagran tity types	n for a BANK 5. Also specify	database primary k	schema with a ey and structura	at 5 al	CO2	L3
3			What is a weak entity type? Explain the role of partial key in design of weak entity type.						CO2	L3
4	4		Explain the t neat diagran	ypical cc 1.	omponents mo	odule of a	DBMS, with a	5	CO1	L2
5	5		Discuss the how it differs	main ch from tra	naracteristics Iditional file sy	of databas vstems	se approach an	d 5	CO1	L2
6			Describe the mappings ar	e three s nong scł	schema archit nema levels?	ecture . W	/hy do we nee	d 5	CO1	L2
7			Define an e attributes tha	ntity or a at occur	attribute . Exp in a ER diagra	olain the c m model w	lifferent types o vith example	of 5	CO2	L3
8			In SQL whic how constra with suitable	h comm ints are example	nand is used specified in e.	for table of SQL durin	creation? Explain g table creation	in 5 in	CO4	L3
9			Explain the r examples	elational	l algebra opei	rations fror	n set theory wit	h 5	CO3	L3
10			Consider the	followin	ig RESORT da	tabase		5	C04	L3

	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 13 / 22
A			

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	RESORT (resort no, resort name, resort type, resort addr,	
	resort city, numsuite)	
	SUITE( suit no, resort no, suite price)	
	RESERVATION(reservation no, resort no, visitor no, check in,	
	check out, totoal visitors, suite no)	
	VISITOR(visitor no, firstname, lastname, visiter addr)	
	1) write the sql to list full details of all the resorts on los	
	angeles	
	2) write the sql list full details of all the resorts having number	
	of suits more than 30)	
	3) write the sql to list visitor in ascending order by firstname.	

### D2. TEACHING PLAN - 2

# Module - 3

Title:	SQL	Appr Time:	16 Hrs
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Apply the triggers and views in database schema.	CO5	L3
2	Analyze the access methods to store the data through internet application	CO6	L4
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	More complex SQL retrieval queries,	C6	L3
2	Specifying constraints as assertions and action triggers, Views in SQL		L3
3	Schema change statements in SQL.		L3
	Database Application Development:Accessing databases from applications		L4
4	An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures		L4
5	Case study: The internet Bookshop.	C5	L4
6	Internet Applications: The three-Tier application architecture, the presentation layer, the middle tier		L4
C	Application Areas	CO	Level
<b>c</b>	Application Areas Creation of schema using triggers and views	<b>CO</b> 5	Level
<b>c</b> 1 2	Application Areas         Creation of schema using triggers and views         Accessing the database for various internet applications	<b>CO</b> 5 CO6	Level L3 L4
<b>c</b> 1 2 <b>d</b>	Application Areas         Creation of schema using triggers and views         Accessing the database for various internet applications         Review Questions	<b>CO</b> 5 CO6	Level L3 L4 -
c           1           2           d           1	Application Areas         Creation of schema using triggers and views         Accessing the database for various internet applications         Review Questions         Describe the six clauses in the syntax of an SQL retrieval query. Show what type of constructs can be specified in each of the six clauses.Which of the six clauses are required and which are optional?	CO5 CO6 - CO5	Level L3 L4 - L3
<b>c</b> 1 2 <b>d</b> 1 2	Application Areas         Creation of schema using triggers and views         Accessing the database for various internet applications         Review Questions         Describe the six clauses in the syntax of an SQL retrieval query. Show what type of constructs can be specified in each of the six clauses. Which of the six clauses are required and which are optional?         Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for.         a. Nested queries.         b. Joined tables and outer joins.         c. Aggregate functions and grouping.         d. Triggers.         e. Assertions and how they differ from triggers.         f. Views and their updatability.         g. Schema change commands.	CO5 CO5 CO5 CO5 CO5	Level L3 L4 - L3 L3
<b>c</b> 1 2 <b>d</b> 1 2 2	Application Areas         Creation of schema using triggers and views         Accessing the database for various internet applications         Review Questions         Describe the six clauses in the syntax of an SQL retrieval query. Show what type of constructs can be specified in each of the six clauses.Which of the six clauses are required and which are optional?         Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for.         a. Nested queries.         b. Joined tables and outer joins.         c. Aggregate functions and grouping.         d. Triggers.         e. Assertions and how they differ from triggers.         f. Views and their updatability.         g. Schema change commands.         Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses	CO5 CO5 CO5 CO5 CO5	Level L3 L4 - L3 L3 L3 L3 L3

	SKIT	Teaching Process	Rev No.:	1.0				
	Doc Code:	SKIT.Ph5b1.F02	Date: 03	-08-2018				
Concerned and the second	Title:	Course Plan	Page: 14	/ 22				
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5	Explain the three tier application architecture?	CO6	L4
е	Experiences	-	-
1			
2			
3			
4			
5			

### Module – 4

Title:	Normalization	Appr Time:	16 Hrs
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Apply the normalization techniques to normalize the database using mathematical modelling	C07	L3
2	Analyze the different types of algorithm using database design theory for different applications	CO8	L4
b	Course Schedule		
Class No	Module Content Covered	СО	Level
1	Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema	CO7	L3
2	Functional Dependencies, Normal Forms based on Primary Keys	CO7	L3
3	Second and Third Normal Forms	CO7	L3
4	Boyce-Codd Normal Form, Multivalued	CO7	L3
5	Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	CO7	L3
6	Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions	CO8	L4
7	Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs,	CO8	L4
8	Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms	CO8	L4
			<b>1 1</b>
C	Application Areas		Level
1	Using mathematical modelling techniques for hormalization	<u> </u>	
2			L4
d	Peview Questions		
1	What is a functional dependency? What are the possible sources of the information that defines the functional dependencies that hold among the attributes of a relation schema?	CO7	L3
2	What undesirable dependencies are avoided when a relation is in 3NF?	C07	L3
3	Why should NULL s in a relation be avoided as much as possible? Discuss the problem of spurious tuples and how we may prevent it.	CO8	L4
4	What is meant by the attribute preservation condition on a decomposition?	CO8	L4
5	Discuss the NULL value and dangling tuple problems.	CO8	L4
е	Experiences	-	-
1		CO7	L2
2			
3			

	SKIT	Teaching Process	Rev No.:	1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-	-08-2018
	Title:	Course Plan	Page: 15 / 22	
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4			CO8	L3
5				

## E2. CIA EXAM – 2

# a. Model Question Paper - 2

Crs Code:		15CS53	Sem:	5	Marks:	20	Time:	80minute	s	
Course:		Databse N	Management	System						
-	-	Note: Ans	swer any 2 qu	uestions, ea	ach carry ec	jual marks	S.	Marks	CO	Level
1	а	Discuss h the variou 1) Nested 2) Aggreg 3) Trigger 4) Views a 5) Schema 6) Group I	ow each of t is options for queries ate functions s and their upd a change stat by and having	he following each const atability tements g clause	g constructs ructs:	s is used ir	n SQL and discu	ISS 20	CO5	L3
	b	Define an database CREATE \ FROM GR DEPT_SU Dno , COU EMPLOYE State whi the view. correspor give its re a. SELECT DEPT_SU b. SELECT DEPT_SU c. SELECT WHERE D AVERAGE C > ( SELE d. UPDAT WHERE D D =3	COMPANY and Conside /IEWAS SELE OUP BY MMARY ( D , JNT (*), SUM E Dno ; ch of the fol If a query ding query of sult when ap FROM * MMARY ; FROM WHE MMARY TOT FROM WHE MMARY TOT FROM S.S DEPT_SUM ECT C FROM E SET DEPT_SUMM/	r the follow ECT C , Total_s , 1 ( Salary ), A lowing que or update or update or plied to the ERE D , C AL_S > 1000 MMARY DEPT_SUM	ing view, DE Average_s AVG ( Salary ries and up e would be n the base re database. 000; MARY WHE	EPT_SUMN ) ) dates wou e allowed elations w	MARY , uld be allowed , show what t ould look like, a	on he nd		
	С	Describe what type of the six	the six clause of construct clauses are r	ses in the s is can be sp equired and	yntax of an becified in ea d which are	SQL retri ach of the optional?	ieval query. Sho six clauses. Whi	ow ch		L3
	d	Discuss h NULL s tr How are N	ow NULL s a reated when NULL s treate	re treated ir aggregate ed if they ex	n compariso functions a ist in groupi	n operato re applied ng attribu	rs in SQL. How a I in an SQL que tes?	ıre γ?		L3
2	2	Evolain th	a three tier a	nnlicationa	rchitectura	>		20	00	
	b	What is C	GI? Why was	CGI introdu	iced? What	are the di	sadvantages of	an		
		architectu	ire using CGI	scripts?	modification					
	C	considere	ed bad? Illusti	rate with ex	amples	i anamoli	es. why are th	еу		
	d	Explain JE	DBC classes a	and interfac	es					L4
		). )	functional d	opondonev	2 \X/hat ara	the need	bla sources of t	ho 20		
3	d	informatic the attribu	nunctional d on that defin- utes of a relat	ependency es the func tion schema	r what are ctional depe a?	endencies	that hold amo	ng		
	b	Define firs	st, second, ar	nd third nor	mal forms	when only	/ primary keys a	are		L3

	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 16 / 22

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		considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary			
		keys?			
	С	Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF?			L3
	d	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.			L3
4	а	Discuss the NULL value and dangling tuple problems.	20	CO8	L4
	b	Define non-additive joint property of a decomposition and write an algorithm of testing for non-additive joint property			L4
	С	What is the dependency preservation property for a decomposition? Why is it important?			L4
	d	Define fourth normal form. When is it violated? When is it typically applicable?			L4

# b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

	Model Assignment Questions									
Crs C	ode:	15CS53	Sem:	5	Marks:	5 / 10	Time:	90 - 120	minute	S
Cours	Course: Database Management System									
Note:	Note: Each student to answer 2-3 assignments. Each assignment carries equal mark						ark.			
SNo		USN		Assig	gnment Desc	ription		Marks	CO	Level
1			Discuss how	each of th	ne following (	constructs	s is used in SQ	L 5	CO5	L3
			and discuss t	he various	options for e	ach const	ructs:			
			1) Nested que	eries						
			2) Aggregate	functions						
			3) Triggers							
			4) VIEWS and	their upda	tability					
			5) Schema cr	lange state	ements					
2			Draw, and o	volain thr	clause	itocturo	and tachnolog		C06	
2			rolovant to	opch tior	vyrito tho a	dvantage	and lechnolog	ly 5		L4
					while the c	luvantaye		51		
2	2 V/bat is CGI2 V/by was CGL introduced2 V/bat are the					6 5	C06	11		
	disadvantages of an architecture using CGI scripts?							L4		
4			Define non-a	dditive io	int property	of a dec	omposition an	d 5	CO8	L4
-			write an algo	rithm of te	sting for non-	additive j	pint property			
5			Discuss inser	tion , dele	tion and mo	dification	anamolies. Wh	у 5	CO6	L4
6			Dofino on CO			nın exam	JIES		COF	12
			database and	l Consider	the following	VIOW DE	DT SIIMMADV	5	005	3
				(/AS SELE(	CT			'		
			FROM GROU	P RY						
			DEPT_SUMM	ARY ( D , C	C , Total_s , Av	/eraqe_s )	1			
			Dno , COUNT	(*), SUM	(Salary), AV(	G (Salary)	)			
			EMPLOYEE D	no ;	2					
			State which	of the foll	owing querie	s and up	dates would b	e		
			allowed on t	ne view. If	a query or u	pdate wo	ould be allowed	d,		
			show what t	he corresp	onding quer	y or upda	ate on the bas	e		
			relations wou	ıld look lik	ke, and give i	ts result v	when applied t	0		
			the database							
			a. SELECT FR							
			DEPT_SUMM							
			D. SELECT FF	OM WHE	RED,C					

Comment of	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 17 / 22

DEPT_SUMMARY TOTAL_S > 100000; c. SELECT FROM WHERE D, AVERAGE_S DEPT_SUMMARY C > ( SELECT C FROM DEPT_SUMMARY WHERE D =4); d. UPDATE SET WHERE DEPT_SUMMARY D =3 D =4; e. DELETE WHERE FROM DEPT_SUMMARY C > 4;D =3 C < CO7Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?5CO7L3	Copyrigh	©2017. cAAS. All rights reserved.			
c. SELECT FROM WHERE D, AVERAGE_S DEPT_SUMMARY C > (SELECT C FROM DEPT_SUMMARY WHERE D =4); d. UPDATE SET WHERE DEPT_SUMMARY D =3 D =4; e. DELETE WHERE FROM DEPT_SUMMARY C > 4;D = 3 C > 4;7Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?5CO7L3		DEPT_SUMMARY TOTAL_S > 100000;			
WHERE D,         AVERAGE_S DEPT_SUMMARY         C > (SELECT C FROM DEPT_SUMMARY WHERE D =4);         d. UPDATE SET         WHERE DEPT_SUMMARY         D =3         D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         5         CO7         L3         keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?		c. SELECT FROM			
AVERAGE_S DEPT_SUMMARY         C > ( SELECT C FROM DEPT_SUMMARY WHERE D =4);         d. UPDATE SET         WHERE DEPT_SUMMARY         D =3         D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         5         CO7         L3         keys are considered. How do the general definitions of 2NF         and 3NF, which consider all keys of a relation, differ from         those that consider only primary keys?		WHERE D ,			
C > ( SELECT C FROM DEPT_SUMMARY WHERE D =4);         d. UPDATE SET         WHERE DEPT_SUMMARY         D =3         D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         6         C > 4;         7         Define first, second, and third normal forms when only primary         5         CO7         L3         keys are considered. How do the general definitions of 2NF         and 3NF, which consider all keys of a relation, differ from         those that consider only primary keys?		AVERAGE_S DEPT_SUMMARY			
d. UPDATE SET         WHERE DEPT_SUMMARY         D =3         D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7         Define first, second, and third normal forms when only primary         5         CO7         L3         keys are considered. How do the general definitions of 2NF         and 3NF, which consider all keys of a relation, differ from         those that consider only primary keys?		C > ( SELECT C FROM DEPT_SUMMARY WHERE D =4);			
WHERE DEPT_SUMMARY         D =3         D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7         Define first, second, and third normal forms when only primary         f         Comparison         prime		d. UPDATE SET			
D =3       D =4;         e. DELETE WHERE FROM DEPT_SUMMARY         C > 4;         7       Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?       5       CO7       L3		WHERE DEPT_SUMMARY			
D =4;       e. DELETE WHERE FROM DEPT_SUMMARY       below b		D =3			
e. DELETE WHERE FROM DEPT_SUMMARY       C > 4;         7       Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?       5       CO7       L3		D =4;			
C > 4;Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?CO7L3		e. DELETE WHERE FROM DEPT_SUMMARY			
7Define first, second, and third normal forms when only primary keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?5CO7L3		C > 4;			
keys are considered. How do the general definitions of 2NF and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?	7	Define first, second, and third normal forms when only primary	5	CO7	L3
and 3NF, which consider all keys of a relation, differ from those that consider only primary keys?		keys are considered. How do the general definitions of 2NF			
those that consider only primary keys?		and 3NF, which consider all keys of a relation, differ from			
		those that consider only primary keys?			
8   Define Boyce-Codd normal form. How does it differ from 3NF? 5 CO7 L3	8	Define Boyce-Codd normal form. How does it differ from 3NF?	5	CO7	L3
Why is it considered a stronger form of 3NF?		Why is it considered a stronger form of 3NF?			
9 What is the dependency preservation property for a 5 CO8 L4	9	What is the dependency preservation property for a	5	CO8	L4
decomposition? Why is it important?		decomposition? Why is it important?			
10 Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} 5 C07 L3	10	Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J}	5	C07	L3
and the set of functional dependencies $F = \{ \{A, B\} \rightarrow \{C\} \}$		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?		[A]→[D, E], [B]→[F], {F]→[G,H], {D]→[I, J] }. What is the key for R?			
Decompose R into 2NF and then 3NF relations.		Decompose R into 2NF and then 3NF relations.			

# D3. TEACHING PLAN - 3

# Module – 5

Title:	Transaction processing	Appr	16 Hrs
		Time:	
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Demonstrate the transaction and query processing	CO9	L5
2	Analyze and implement the concurrency control and database recovery protocols in database	CO10	L5
b	Course Schedule		
Class No	Module Content Covered	СО	Level
1	Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions,	CO9	L5
2	Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, transaction support in SQL	CO9	L5
3	Concurrency Control in Databases: Two-phase locking techniques for Concurrency control	CO10	L5
4	Concurrency control based on Timestamp ordering,	CO10	L5
5	Multiversion Concurrency control techniques,	CO10	L5
6	Validation Concurrency control techniques	CO10	L5
7	Granularity of Data items and Multiple Granularity Locking. Introduction to Database Recovery Protocols: Recovery Concepts	CO10	L5
8	NO-UNDO/REDO recovery based on Deferred update	CO10	L5
9	Recovery techniques based on immediate update	CO10	L5
10	Shadow paging, Database backup and recovery from catastrophic failures	CO10	L5
С	Application Areas	CO	Level
1	Applying the characterizing schedules for transaction processing	CO10	L5
2	Understand the concurrency control techniques and database recovery protocols	CO9	L5

	SKIT	Teaching Process	Rev No.: 1.0
((Es))	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 18 / 22

d	Review Questions	-	-
1	Draw a state diagram and discuss the typical states that a transaction goes through during execution.	CO9	L5
2	Discuss the atomicity, durability, isolation, and consistency preservation properties of a database transaction.	CO9	L5
3	Describe the four levels of isolation in SQL.	CO9	L5
4	What is a timestamp? How does the system generate timestamps?	CO10	L5
5	What are UNDO -type and REDO -type log entries?	CO10	L5
е	Experiences	-	-
1		CO10	L2
2			
3			
4		CO9	L3
5			

# E3. CIA EXAM – 3

## a. Model Question Paper - 3

Crs (	Code:	15CS53	Sem:	5	Marks:	20	Time:	80minute	s	
Cour	rse:	Database N	lanageme	ent System	า					
-	-	Note: Ansv	ver any 2	questions,	each carry e	qual mark	S.	Marks	СО	Level
1	a	Draw a sta goes throu	ite diagra gh during	m and dis execution	cuss the typi	cal states	that a transacti	on 20	CO9	L5
	b	Discuss AC	iscuss ACID properties of a database transaction							L5
	С	Discuss the a database	e actions t	aken by th	ne read_item a	and write_i	tem operations	on		L5
	d	What is a schedule (history)? Define the concepts of recoverable, cascadeless, and strict schedules, and compare them in terms of their recoverability.						le, eir		L5
2	a	Explain trar	nsaction s	upport in S	SQL			20	COg	L5
	b	What is the two-phase locking protocol? How does it guarantee serializability?						ee		L5
	С	Discuss the timestamp ordering protocol for concurrency control. How does strict timestamp ordering differ from basic timestamp ordering?					w/		L5	
	d	What is m used?	iultiple gr	anularity	locking? Und	er what c	ircumstances is	it		L5
3	a	What are L	INDO -typ	e and RED	0 -type log e	ntries?		20	CO10	L5
	b	Describe th	ne wait-die	and wou	nd-wait proto	cols for dea	adlock preventic	n.		L5
	С	Describe circumstan	the shad ces does	dow pag it not requ	ing recovery ire a log?	techniq	ue. Under wh	nat		L5
	d	Discuss the failure?	e differen	t types of	failures. Wh	at is mear	nt by catastroph	nic		L5
4	a	What do th to buffer m	ne terms s anageme	teal/no-st nt for trans	teal and force saction proces	/no-force sing?	mean with rega	rd 20	CO10	L5
	b	Discuss the that use ea	e UNDO a ch.	and REDO	operations a	nd the rea	covery techniqu	es		L5
	С	What is m rollback?	eant by	ransactior	ı rollback? W	'hat is me	ant by cascadi	ng		L5
	d	Describe th	ne three p	nases of th	e ARIES recov	ery metho	od.			L5

( Second	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 19 / 22

### b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

			M	odel Assignment	Questions	S			
Crs Coc	de: 15CS5	3 Sem:	5	Marks:	5 / 10	Time:	90 - 120	minutes	5
Course: Database Management System									
Note: E	ach studer	t to answe	r 2-3 assigr	ments. Each ass	ignment c	arries equal ma	ark.		
SNo	USN		A	Assignment Dese	cription		Marks	CO	Level
1		Discuss .	ACID prope	rties of a databa	se transac	tion	5	CO9	L5
2		Explain t	ransaction	support in SQL			5	CO9	L5
3	3 Discuss the actions taken by the read_item and write_item operations on a database.					n	CO9	L5	
4	4 What is a schedule (history)? Define the concepts of recoverable, cascadeless, and strict schedules, and compare them in terms of their recoverability.				of 5 e	CO9	L5		
5	5 What is the two-phase locking protocol? How does it guarantee serializability?				it	CO9	L5		
6		Describe preventi	e the wait-d on.	lie and wound-w	ait protoc	ols for deadloc	k	CO10	L5
7		Discuss control. timestan	the timest How does s np ordering	amp ordering   strict timestamp ?	orotocol f ordering (	or concurrenc differ from bas	c c	CO9	L5
8		Discuss techniqu	the UNDO les that use	and REDO ope each.	erations ar	nd the recover	У	CO10	L5
9		Describe circumst	e the shado ances does	w paging recove s it not require a l	ery technic .og?	que. Under wha	at	CO10	L5
10		What do with rega	o the terms ard to buffe	steal/no-steal r management f	and force, or transact	/no-force mea ion processing	n ?	CO10	L5

### F. EXAM PREPARATION

#### 1. University Model Question Paper

Cour	rse:	Database Management System			Month /	' Year	May /	2018
Crs (	Code:	15CS53 Sem: V	Marks:	80	Time:		180 mi	inutes
-	Note	Answer all FIVE full questions. Al	ll questions carry equ	al marks.		Marks	СО	Level
1	а	Explain the typical components r	module of a DBMS, w	rith a neat di	agram.		CO1	
	b	Define the following with examp a)Value set b)Complex attribute e)metadate	les c)data model d)Scher	na construct	-			
	С	Draw an ER diagram for a BANK types. Also specify primary key a	database schema wit and structural constra	h at least fiv nts.	e entity		CO2	
	d	What is a weak entity type? Expl weak entity type.	ain the role of partial I	key in desigr	n of			
			OR					
-	а	Discuss the main characteristics from traditional file systems	of database approac	h and how i	t differs	16 / 20	CO1	
	b	Describe the three schema arc among schema levels?	chitecture . Why do y	we need ma	appings			
	С	Define an entity or attribute . Exp occur in a ER diagram model wit	plain the different typ h example	es of attribu	tes that		C02	
	d	Under what conditions can an a migrated to become an attribute	attribute of a binary r of the participating e	elationship † ntity types?	type be			

(Commerce)	SKIT	Teaching Process	Rev No.: 1.0
	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
1000 C	Title:	Course Plan	Page: 20 / 22

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2	а	Consider the following relations for a database that keeps track of	16 /	C03	
		student enrollment in courses and the books adopted for each course:	20		
		STUDENT (Ssn Name Major Bdate)	-		
		COLIDSES(Courset Chame Dont)			
		EVIDOL I (See Course # Ouerter Crade)			
		EINRULL( <u>SSII,COUISE#, Quarter</u> , Grade)			
		BOOK_ADOPTION( <u>Course#,Querter</u> ,Book_isbn)			
		TEXT( <u>Book_isbn</u> ,Book_title,Publisher,Author)			
	b	Explain the relational algebra operations from set theory with examples			
	С	Consider the following RESORT database		CO4	
		RESORT (resort no resort name resort type resort addr resort city			
		$n_{1}$			
		CLITE( quit no recort no quito prico)			
		DECEDVATION/resonation no reserve on visiter no sheet in sheet out			
		RESERVATION(reservation no, resort no, visitor no, check in, check out,			
		totoal visitors, suite no)			
		VISITOR(visitor no, firstname, lastname, visiter addr)			
		1) write the sql to list full details of all the resorts on los angeles			
		2) write the sql list full details of all the resorts having number of suits			
		more than 30)			
		3) write the sql to list visitor in ascending order by firstname.			
	Ь	In SQL which command is used for table creation? Explain how			
	ŭ	constraints are specified in SOL during table creation with suitable			
		eventilations are specified in SQL during table creation with suitable			
		example.			
		OR			
-	а	What is the difference between candidate key, primary key and unique	16 /	CO3	
		key?	20		
	b	Discuss the various reasons that lead to the occurrence of NULL values			
		in relations?			
	<u> </u>	W/hat are the rules that must be satisfied by the foreign $k_{0}/2$		COA	
	ر م	Evaluin have constraints are encoifed in COL during table creation with		004	
1 1				r	
	u	Explain now constraints are specified in SQL during table creation with			
	u	suitable examples.			
	u	suitable examples.			
3	a	Discuss how each of the following constructs is used in SQL, and discuss	16 /	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands.	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses	16 / 20	CO5	
3	a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL?	16 / 20	CO5	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an	16 / 20	CO5 CO6	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	16 / 20	CO5 CO6	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	16 / 20	CO5 CO6	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?	16 / 20	CO5	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? OR Specify the following views in SQL on the COMPANY database schema	16 / 20	CO5 CO6 CO5	
3	a b c d a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? OR Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager	16 / 20	CO5 CO6 CO5	
3	a b c d a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? CR Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department.	16 / 20	CO5 CO6 CO5	
3	a b c d a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? CR Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee	16 / 20	CO5 CO6 CO5	
3	a b c d a	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department.	16 / 20	CO5 CO6 CO5	
3	a b c d	Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name.	16 / 20	CO5	
3	a b c d	Explain how constraints are specified in SQL during table creation with suitable examples. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number	16 / 20	CO5	
3	a b c d a	Explain now constraints are specified in SQL during table creation with suitable examples. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number of employees and total hours worked per week on the project for each	16 / 20	CO5	
3	a b c d a	Explain now constraints are specified in SQL during table creation with suitable examples. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project	16 / 20	CO5	
3	a b c d	Suitable examples. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? <b>OR</b> Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and manager salary for every department. b) A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project.	16 / 20	CO5	
3	a b c d a	Explain how constraints are specified in SQL during table creation with suitable examples. Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for. a. Nested queries. b. Joined tables and outer joins. c. Aggregate functions and grouping. d. Triggers. e. Assertions and how they differ from triggers. f. Views and their updatability. g. Schema change commands. Describe conceptually how an SQL retrival query will be executed by specifying the conceptual order of executing each of the six clauses What are the basic data types available for the attributes in SQL? What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts? OR Specify the following views in SQL on the COMPANY database schema a) A view that has the department name, manager name, and employee salary for each employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. c) A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project. d) A view that has the project name, controlling department name, manager	16 / 20	CO5	

Contraction of the second	SKIT	Teaching Process	Rev No.: 1.0
((3))	Doc Code:	SKIT.Ph5b1.F02	Date: 03-08-2018
	Title:	Course Plan	Page: 21 / 22

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		of employees, and total hours worked per week on the project for each			
		project with more than one employee working on it.			
	b	What are the basic data types available for the attributes in SQL?			
	С	Discuss insertion, deletion and modification anamolies. Why are they		CO6	
		considered bad? Illustrate with examples.			
	d	Explain JDBC classes and interfaces.			
4	а	Define Boyce-Codd normal form. How does it differ from 3NF? Why is it	16 /	CO7	
		considered a stronger form of 3NF?	20		
	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.			
	С	Define non-additive joint property of a decomposition and write an		C08	
		algorithm of testing for non-additive joint property			
	d	What is the dependency preservation property for a decomposition?			
		Why is it important?			
		OR			
-	a	What is meant by the attribute preservation condition on a	16 /	CO7	
		decomposition ? Why should NULL s in a relation be avoided as much as	20		
		possible?			
	b	What is a functional dependency? What are the possible sources of the			
		information that defines the functional dependencies that hold among			
		the attributes of a relation schema?			
	С	Discuss the problem of spurious tuples and how we may prevent it.		CO8	
	d	What undesirable dependencies are avoided when a relation is in 3NF?			
5	a	Draw a state diagram and discuss the typical states that a transaction	16 /	CO9	
		goes through during execution.	20		
	b	Discuss ACID properties of a database transaction			
	С	Describe the shadow paging recovery technique. Under what		CO10	
		circumstances does it not require a log?			
	d	Discuss the different types of failures. What is meant by catastrophic			
		failure?			
		OR			
	a	What is the two-phase locking protocol? How does it guarantee	16 /	CO9	
		serializability?	20		
	b	Discuss the timestamp ordering protocol for concurrency control. How			
		does strict timestamp ordering differ from basic timestamp ordering?			
	С	What do the terms steal/no-steal and force/no-force mean with regard		C010	
		to buffer management for transaction processing?			
	d	Describe the three phases of the ARIES recovery method.			

# 2. SEE Important Questions

Course:		Database Mai	nagement S	ystem			Month	/ Year	May /	2018
Crs Code:		15CS53	Sem:	5	Marks:	100	Time:		180 mi	inutes
	Note	Answer all FIV	Answer all FIVE full questions. All questions carry equal marks.					-	-	
Mo	Qno.	Important Question				Marks	СО	Year		
dul										
е										
1	1	Explain the ty	pical compo	onents of a DE	3MS with a n	eat diagr	am.	16 /		2018
								20		
	2	Discuss the n	nain Charac	teristics of the	e database a	approach	n. How does i	t		2014
		differ from Tra	aditional file	systems?						
	3	Explain the	three-sche	ma architect	ture. What	is the	logical data	a 🛛		2016
		independenc	e and physic	cal data indep	endence?					

(Samera)	SKIT	Teaching Process	Rev No.: 1.0
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Canada Ca	Title:	Course Plan	Page: 22 / 22
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	4	Design an ER diagram for an insurance company. Assume suitable entity types like CUSTOMER, AGENT, BRANCH, POLICY, PAYMENT and the relation between them		2015
	5	What are weak entity type? Explain the role of partial key in design of		2015
		weak entity type?		
2	1	Define referential integrity constraint. Explain the importance of referential integrity constraint. How this constraint is implemented	16 / 20	2015
	2	What is valid state and an invalid state, with respect to a database		2013
	3	Given the schema EMP (Fname, Lname, SSN, Bdate, Address, Sex, Salary, SuperSSN, Dno) DEP T(Dname, Dnumber, MgrSSN, MGrstartdate) DEPT-LOC (Dnumber, Dloc) PROJECT(Pname, Pnumber, Ploc,Dnum) WORKS-ON (ESSN,PNo,Hours)		2016
	4	Briefly discuss the different types of update operations on relational database. show an example of a violation of referential integrity in each of the update operation For each of the update operations (Insert, Delete, and Update), we consider what kinds constraint violations may result from applying it and how we might choose to react.		2014
	5	Write queries in SQL for the following Select all EMPLOYEE SSNs , and all combinations of EMPLOYEE SSN and DEPARTMENT DNAME ? Show the resulting salaries if every employee working on the 'ProductX' project is given a 10 percent raise. Make a list of Project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manger of the department that controls the project.		2016
3	1	Explain insert, delete and update statements in SQL with example.	16 / 20	2015
	2	What is embedded SQL? With an example explain how would you Connect to a database, fetch records and display. Also explain the concept of stored procedure in brief.		2015
	3	Explain the syntax of a SELECT statement in SQL write the SQL query for the following relation algebra expression.		2015
	4	How are Triggers and assertions defined in SQL?Explain		2016
	5	What is CGI? Why was CGI introduced? What are the disadvantages of an architecture using CGI scripts?		2018
4	1	What is the need for normalization? Explain the first, second and third normal forms with examples.	16 / 20	2016
	2	Explain informal design guidelines for relation schemas.		2016
	3	Discuss insertion, deletion, and modification anomalies. Why they are bad? Illustrate with example?		2014
	4	Which normal form is based on the concept of transitive dependency? Explain with an example the decomposition into 3NF		2016
	5	Explain multivalued dependency and fourth normal form 4NF with examples.		2016
5	1	What is a schedule? Explain with example serial, non serial and conflict serializable schedules.	16 / 20	2016
	2	What is Serializibility?How can seriaizability?Justify your answer?		2018
	3	Explain two Phase Locking Protocol and its disadvantages?		2016
L	4	Explain Time stamp ordering algorithm.		2016
	5	Explain ARIES Algorithm.		2016