

Final Examination Cover Sheet

Second Semester: 1436-1437 / 2015-2016

Course Title: <u>INTRODUCTION TO DATABASE</u>	Course Code: <u>IT244</u>
Exam Duration: <u>2 HOURS</u>	Number of Pages: (including cover page) <u>12</u>

Student Name: _____	Student ID: _____
Course Instructor: _____	Exam Date: _____

Exam Guidelines	
<ul style="list-style-type: none"> Mobile phones are not permitted. 	
Marking Scheme	
Questions	Score
Question 1 (20 Marks)	
Question 2 (10 Marks)	
Question 3 (10 Marks)	
Question 4 (20 Marks)	
Question 5 (10 Marks)	
Question 6 (10 Marks)	
Question 7 (20 Marks)	
Total: 100 Marks	
Total: 50 Marks	

Q. 1 For each of the following multiple choice questions, choose one correct answer.

(20 x 1 =

20)

1. Which is the database language
 - A. C
 - B. C++
 - C. **SQL**
 - D. None of these
2. Which is the component of database management system
 - A. Query Language
 - B. Database Manager
 - C. File manager
 - D. **All of these**
3. Key to represent relationship between tables is called
 - A. Primary key
 - B. Secondary key
 - C. **Foreign key**
 - D. Candidate key
4. A set of possible data values is called
 - A. Attribute
 - B. Degree
 - C. Tuple
 - D. **Domain**
5. Fixed point number, with user-specified precision of p digits, with n digits to the right of decimal point is
 - A. Char (p,d)
 - B. **Numeric (p,d)**
 - C. Float (p,d)
 - D. Above all
6. A _____ is a select-from-where expression that is nested within another query
 - A. Schema
 - B. **Subquery**
 - C. Query

- D. Above all
7. What command is used to get back the privileges offered by the GRANT command?
- A. Grant
 - B. **Revoke**
 - C. Execute
 - D. Run
8. _____ is a logical unit of work that contain one or more SQL statements.
- A. Query
 - B. Workspace
 - C. **Transaction**
 - D. Savepoint
9. _____ computes the join and then adds tuples from one relation that does not match tuples in the other relation to the result of the join.
- A. Join
 - B. Natural join
 - C. Cartesian product
 - D. **Outer join**
10. Avg, min, max, sum and count are called _____ functions.
- A. Algebra
 - B. Normal
 - C. **Aggregate**
 - D. Complex
11. Transaction either fully executed or rolled back as if it never occurred is
- A. **Atomic transaction**
 - B. Rollback work
 - C. Commit work
 - D. API
12. A _____ relationship set is represented as a schema with attributes for the primary keys of the two participating entity sets, and any descriptive attributes of the relationship set.
- A. **Many-to-Many**
 - B. Many-to-One
 - C. One-to-Many
 - D. One-to-One
13. In the below figure, Section is considered to be



- A. Strong entity

- B. Primary key
 - C. TABLE operation
 - D. **Weak entity**
14. An is a set of entities of the same type that share the same properties
- A. **Entity set**
 - B. Attributes
 - C. Primary key
 - D. Relation
15. Tables in second normal form (2NF):
- A. Eliminate transitive dependencies.
 - B. Have fields must contain a single value.
 - C. Have a composite key
 - D. **Have all non key fields depend on the whole primary key**
16. From a structural point of view, 2NF is better than _____.
- A. **1NF**
 - B. 3NF
 - C. 4NF
 - D. BCNF
17. What does HTML stand for?
- A. Home Tool Markup Language
 - B. Hyperlinks and Text Markup Language
 - C. **Hyper Text Markup Language**
 - D. High Tool Markup Language
18. _____ a small piece of text containing identifying information.
- A. HTML
 - B. HTTP
 - C. **Cookies**
 - D. Encryption
19. Audit Trails are used to:
- A. Authorize a user

- B. **Locate when and how a data is updated**
 - C. Encrypt data
 - D. Reduce cost of serving pages
20. _____ is (are) a server side scripting language
- A. JSP
 - B. PHP
 - C. **Both A and B**
 - D. None of the above

Q. 2 For each of the following statements, answer with True or False. (10 x 1 = 10)

S. No.	STATEMENT	TRUE/FA LSE
1.	A primary key is a field whose values identify each record in a database	TRUE
2.	A database management system is a collection of interrelated data and a set of program to access those data	TRUE
3.	Atomic attributes are attributes that can be further divided.	FALSE
4.	NULL signifies an unknown value or a value that does not exist	TRUE
5.	The duplicate rows removed from the result of project operation	TRUE
6.	Given the functional dependency $R \rightarrow (S,T)$, then it is also true that $R \rightarrow S$.	TRUE
7.	A relation is in Boyce-Codd Normal Form (BCNF) if every determinant is a composite key.	FALSE
8.	A table is in BCNF if every determinant in the table is a candidate key	TRUE
9.	Cookies can be stored permanently or for a limited time	TRUE
10.	HyperText Transfer Protocol (HTTP) is used for communication with the Web server.	TRUE

**Q. 3 Fill in the blanks with appropriate words:
(10 x 1 = 10)**

Weak Entity Set First Grant Second
View HTTP Time Stamp Normalization
Cookie Index Rename File Manager

1. An entity set that does not have a primary key is referred to as a **Weak Entity Set**.
2. **File Manager** manages the allocation of space on disk storage and the data structures used to represent information stored on disk.
3. The **HTTP** protocol is connectionless.
4. To give authorization to database users on table and views, the SQL command **Grant** is used.
5. The operator **ƚ** means **Rename**
6. The main task carried out in the **First** normal form is to remove repeating attributes to separate tables.
7. **Normalization** is a process to help reduce the likelihood of data anomalies.
8. **Index** is a data structure used to speed up access to records with specified values.
9. **Timestamp** type is the date plus time of day.
10. A **Cookie** is a small piece of text containing identifying information that sent by server to browser or reversely.

**Q. 4 Answer the following questions briefly.
(5 x 4 = 20)**

1. What is a view?

Answer: Any relation that is not of the conceptual model but is made visible to a user as a “virtual relation” is called a view.

2. List three goals of normalization.

Answer:

- a. Prove that each relation scheme is in good form
- b. The decomposition is a lossless-join decomposition
- c. The decomposition should be dependency preserving.

3. What is the difference between commit work and rollback work in transaction?

Answer: Commit work commits the current transaction; that is, it makes the updates performed by the transaction become permanent in the database. After the transaction is committed, a new transaction is automatically started.

Rollback work causes the current transaction to be rolled back; that is, it undoes all the updates performed by the SQL statements in the transaction. Thus, the database state is restored to what it was before the first statement of the transaction was executed.

4. List two reasons why null values might be introduced into the database.

Answer: Nulls may be introduced into the database because the actual value is either unknown or does not exist. For example, an employee whose address has changed and whose new address is not yet known should be retained with a null address. If employee tuples have a composite

5. Explain the distinction between total and partial constraints.

Ans: In a generalization–specialization hierarchy, a total constraint means that an entity belonging to the higher level entity set must belong to the lower level entity set. A partial constraint means that an entity belonging to the higher level entity set may or may not belong to the lower level entity set.

Q. 5 Compute at least 6 rules of the closure of the following set F of functional dependencies for relation schema $R = (A, B, C, D, E)$.

A \rightarrow **BC**

CD \rightarrow **E**

B \rightarrow **D**

E \rightarrow **A**

NOTE: You MUST show all the stages of your work and use Armstrong's Axioms to explain every step.

(10 Marks)

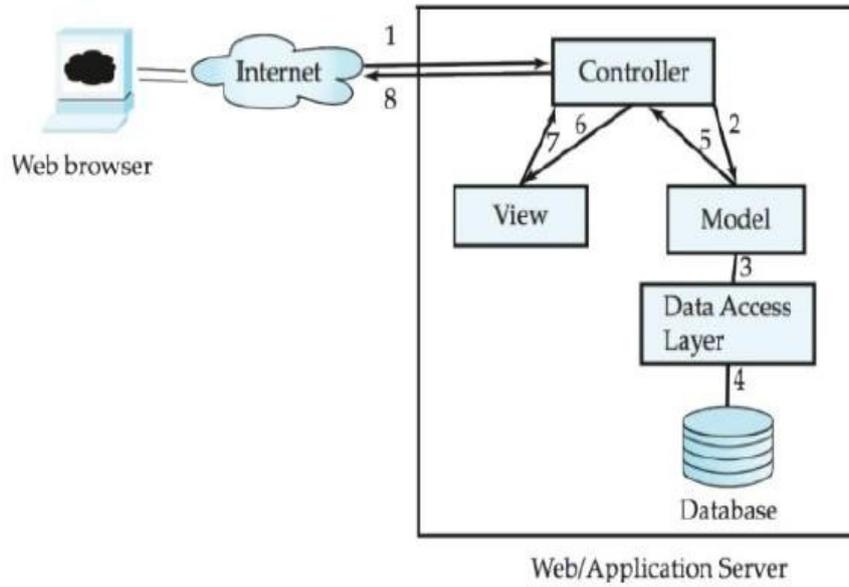
Answer:

1. Starting with $A \rightarrow BC$, we can conclude: $A \rightarrow B$ and $A \rightarrow C$. (decomposition)
2. Since $A \rightarrow B$ and $B \rightarrow D$, $A \rightarrow D$ (transitive)
3. Since $A \rightarrow C$ and $A \rightarrow D$, $A \rightarrow CD$ (union)
4. Since $A \rightarrow CD$ and $CD \rightarrow E$, $A \rightarrow E$ (transitive)
5. Since $A \rightarrow E$ and $E \rightarrow A$, $A \rightarrow A$ (transitive)
6. $A \rightarrow ABCDE$ (union)
7. Since $E \rightarrow A$ and $A \rightarrow ABCDE$, $E \rightarrow ABCDE$ (transitive)
8. Since $CD \rightarrow E$ and $E \rightarrow ABCDE$, $CD \rightarrow ABCDE$ (transitive)
9. Since $B \rightarrow D$ and $BC \rightarrow CD$ (Augmentation with C)
10. Since $BC \rightarrow CD$ and $CD \rightarrow ABCDE$, $BC \rightarrow ABCDE$ (transitive)

Q. 6 Explain the database web application architecture. **(10 Marks)**

Answer:

- 1) The presentation or user interface layer, which deals with user interaction. And it has MVC architecture.
- 2) The business-logic layer, which provides a high-level view of data and actions on data.
- 3) The data access layer, which provides the interface between the business-logic layer and the underlying database



Q. 7 Use the tables below to answer the following questions:

customers

customerid	firstname	lastname	city	state
10101	John	Gray	Lynden	Washington
10298	Leroy	Brown	Pinetop	Arizona
10299	Elroy	Keller	Snoqualmie	Washington
10315	Lisa	Jones	Oshkosh	Wisconsin
10325	Ginger	Schultz	Pocatello	Idaho

items_ordered

customerid	order_date	item	quantity	price
10330	30-Jun-1999	Pogo stick	1	28.00
10101	30-Jun-1999	Raft	1	58.00
10298	01-Jul-1999	Skateboard	1	33.00
10101	01-Jul-1999	Life Vest	4	125.00
10299	06-Jul-1999	Parachute	1	1250.00

Write SQL statements for the following queries: (5 x 4 = 20)

1. List all customers IDs along with their items and order date. (Customer who has not ordered any item should also be shown in the result)

Answer:

```
SELECT customerid, item, order_date  
FROM customers NATURAL LEFT OUTER JOIN items_ordered;
```

2. Create a view *Idaho_customers* to show customers information in Idaho State only.

Answer:

```
CREATE VIEW Idaho_customers AS  
(SELECT customerid, firstname, lastname, city  
FROM customers  
WHERE state="Idaho");
```

3. Find the customerid of customers in the customers table that have 10101 as customerid.

Answer:

```
SELECT CUSTOMERID  
FROM CUSTOMERS  
WHERE CUSTOMERID = '10101'
```

4. Find the highest price of an item in items_ordered table. (4 marks)

Answer:

```
SELECT MAX(PRICE)  
FROM ITEMS_ORDERED;
```

5. Give the user Manager the privilege of reading data from items_ordered relation.

Answer:

```
GRANT SELECT ON items_ordered TO Manager;
```

-----ALL THE BEST-----