Database Fundamentals

Intake : 29 **Time allowed : 2.5 hours**
Name: **Group:**

Question1

Part 1: Answer with Yes or No.

1. In a nested query, the inner query executes first, and once, before the outer query
2. There are physical records corresponding to user created views.
3. Relational data base relation may accept multi-valued data items (attributes).
4. Deleting all tuples of a table is equivalent to dropping it.
5. In a table the records are ordered top to bottom.

Part 2: Choose the correct answer

1. Which of the following is ***NOT*** an advantage of enforcing integrity constraints in the database management system:

   A) Keep the integrity between tables
   B) Updating constraints will be easier.
   C) Maintain consistency among rows in relations.
   D) None

2. Consider the following two tables, called X and Y:

X

Val
1
2
3

Y

Val
2
3
4

Which of the following queries will return the greatest number of rows?

A) SELECT * FROM X, Y
B) SELECT * FROM X, Y WHERE X.Val > Y.Val
C) SELECT * FROM X
   UNION
   SELECT * FROM Y
D) SELECT * FROM X X1, X X2 WHERE X1.Val = X2.val

3. Consider the relational schema R(A, B, C, D, E) with non-key functional Dependencies
   (C, D→E)

(B→C)

Select the strongest statement that can be made about the schema R

A) R is in first normal form
B) R is in second normal form
C) R is in third normal form

4. How many primary keys can a table have?
A) One
B) At least one, but not more than two
C) Between one and five
D) No limit

5. What is the definition of DBMS Architecture :
A) Three levels architecture: External , Conceptual, physical
B) Three levels for mapping different users' views (User, logical , conceptual)
C) Three levels for DBMS internal mappings .(external, User, Internal)
D) None

Q 2: Draw an ERD for the following case study:

A university registration office maintains data about the following entities:

(a) A program is described by number, title, credits, and syllabus.

(b) Course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom. Each course may have one or more prerequisites courses. A program must consist of at least one course. Each course may be listed in one program at most.

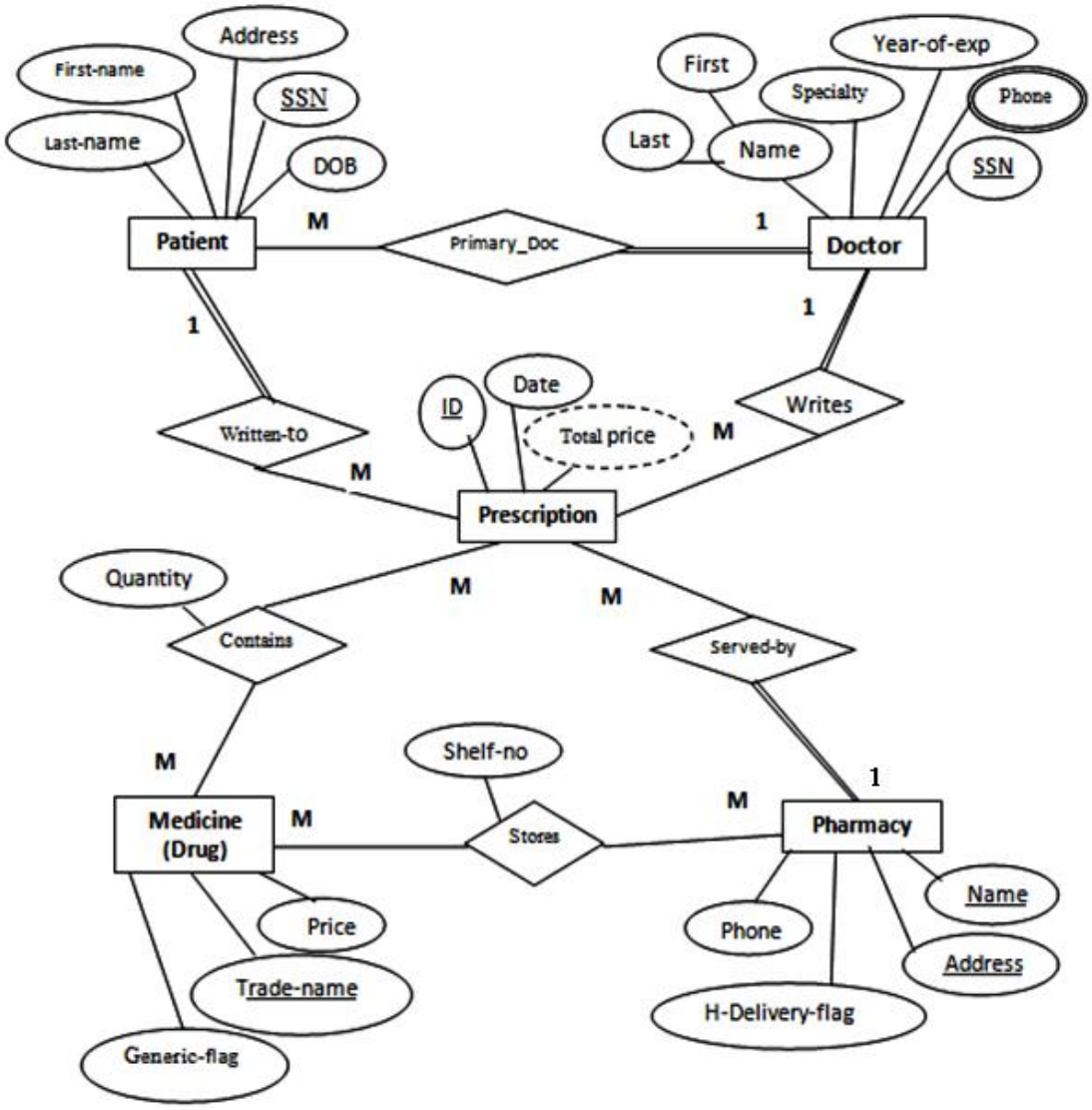
(c) Students, including student-id, name, and qualification.

(d) Instructors, including identification number, name, department and title.

(e) Scientific Departments which defined with Department id, name, internal phone, number of instructors inside, and specialization.

Each department has many instructors, one of whom must be the head of department. An instructor belongs to only one department. Each department offers many different courses, and many instructors can teach one or more course. A student may enroll for many courses offered by different departments. The system stores information about student attendance and evaluation for each course.

Q 3: Draw a Logical Schema (Mapping) for the following ERD:



(Question 4) SQL:

Part 1

Q1: Evaluate the SQL statement

ORDERS

ORD_ID	ORD_DATE	CUST_ID	ORD_TOTAL
100	12-JAN-2000	15	10000
101	09-MAR-2000	40	8000
102	09-MAR-2000	35	12500
103	15-MAR-2000	15	12000
104	25-JUN-2000	15	6000
105	18-JUL-2000	20	5000
106	18-JUL-2000	35	7000
107	21-JUL-2000	20	6500
108	04-AUG-2000	10	8000

CUSTOMERS

CUST_ID	CUST_NAME	CITY
10	Smith	Los Angeles
15	Bob	San Francisco
20	Martin	Chicago
25	Mary	New York
30	Rina	Chicago
35	Smith	New York
40	Linda	New York

```
Select * from orders
        Where cust_id = (select cust_id from customers
                        Where cust_name='Smith');
```

What's the result when the query is executed?

A)

ORD_ID	ORD_DATE	CUST_ID	ORD_TOTAL
102	09-MAR-2000	35	12500
106	18-JUL-2000	35	7000
108	04-AUG-2000	10	8000

B)

ORD_ID	ORD_DATE	CUST_ID	ORD_TOTAL
102	09-MAR-2000	35	12500
106	18-JUL-2000	35	7000

C)

ORD_ID	ORD_DATE	CUST_ID	ORD_TOTAL
108	04-AUG-2000	10	8000

D) None of the above.

Q2: Examine the description of the MARKS table:

STD_ID	NUMBER
STUDENT_NAME	TEXT
SUBJ1	NUMBER
SUBJ2	NUMBER

SUBJ1 and SUBJ2 indicate the marks obtained by a student in two subjects.
Examine this SELECT statement based on the MARKS table:

```
SELECT subj1+subj2 total_marks,id
FROM marks
WHERE subj1>AVG (subj1) AND subj2>AVG (subj2)
ORDER BY total_marks;
```

What is the result of the SELECT statement?

(A) The statement executes successfully and the student id and sum of all marks for each student who obtained more than the average mark in each subject.
(B) The statement returns an error at the SELECT clause.
(C) The statement returns an error at the WHERE clause.
(D) The statement returns an error at the ORDER BY clause.

Q3: If you are writing a select statement to join three tables using join conditions, what is the number of join conditions needed?

A) 0
B) 1
C) 2
D) 3

Q 4: Examine the description of the **EMPLOYEE** table:

EMP_ID	**NUMBER**	**NOTNULL**
LAST_NAME	**TEXT**	**NOTNULL**
FIRST_ NAME	**TEXT**	
DEPT_ID	**NUMBER**	

Which statement produces the number of different departments that have employee with last name Ahmed?

A)
```
Select count(*)
From employee
Where last_name='Ahmed';
```

B)
```
Select count(dept_id)
From employee
Where last_name='Ahmed';
```

C)
```
Select  distinct (count(dept_id))
From employee
```

```
Where last_name='Ahmed';
```

D)
```
Select  count(distinct  dept_id)
From employee
Where last_name='Ahmed';
```

Q5: You need to display the last names of those employees who have the letter "A" as the second character in their names.
Which SQL statement displays the required results?

A)
```
SELECT last_name
FROM EMP
WHERE last_name LIKE '_A%';
```

B)
```
SELECT last_name
FROM EMP
WHERE last name ='*A%';
```

C)
```
SELECT last_name
FROM EMP
WHERE last name ='_A%';
```

D)
```
SELECT last_name
FROM EMP
WHERE last name LIKE '*A%';
```

(Question5) Normalization:

The following table represents the database of a system that stores data about all Car Companies in Egypt. ***Model ID*** **is the identifier for each model** **with a specific color**. *Selling Price* is the price of that model in the specified Company. *Available Quantity* is the quantity of the model in this Company. *Dealer* is the distributer (موزع) of the specified model regardless of the Company. **Company *ID*** is the current **Primary Key** of the table.

You are required to show the first, second and third normal forms.

Company ID	Company Name	Company Address	Model ID	Model Name	Model Colour	Selling Price	Available Quantity	Dealer	Dealer Address
111	X	Haram,Giza	10	Accent	Silver	85000	3	Hyundai	Doki,Giza
			11	Accent	Black	88000	5	Hyundai	Doki,Giza
			20	Corolla	Black	134000	10	Toyota	Tahrir,Cairo
			30	Yaris	Grey	98000	8	Toyota	Tahrir,Cairo
222	Y	Heliopolis,Cairo	10	Accent	Silver	82000	11	Hyundai	Doki,Giza
			31	Yaris	Silver	97000	5	Toyota	Tahrir,Cairo
333	Z	Doki,Giza	20	Corolla	Black	133000	6	Toyota	Tahrir,Cairo
			21	Corolla	Silver	129000	5	Toyota	Tahrir,Cairo
			40	Cerato	Red	95000	4	Kia	Zamalek,Giza
			41	Cerato	Grey	95000	8	Kia	Zamalek,Giza
			50	Picanto	Light Blue	65000	10	Kia	Zamalek,Giza

Best luck☺.