ISE 305

Fall 2025 Final Test

Practice Version

NAME: FIRST _____

LAST _____

STUDENT ID #_____

Question #	Points Available	Points Earned
1	4	
2	4	
3	4	
4	4	
5	4	
6	4	
7	4	
8	4	
9	4	
10	4	
11	15	
12	15	
13	15	
14	15	
Total:	**100**	

Directions: You have 2 hour and 30 minutes to complete this exam. Write all answers neatly in the space provided. Please do not separate exam sheets. Closed book exam: you are not allowed to use the textbook, lecture notes, cheat sheets.
NOTE: *You can use both the sides of the test to answer the questions.*

Questions 1 to 5 are TRUE/FALSE questions. Circle your choice for correct answer

1. Given a table T with two attributes A and B. Then we may have a special case where: if a functional dependency A->B exists, then the functional dependency B->A may also exist. [4]

- TRUE
- FALSE

2. The primary key attribute (attributes, for composite primary key) functionally determines all the other attributes of the table.

- TRUE [4]
- FALSE

3. A table which is in 1NF (First Normal form), and has an atomic primary key, may not be in 2NF (Second Normal Form) [4]

- TRUE
- FALSE

4. A database that has tables in higher normal forms (example in 3NF) will be less prone to the problems arising because of the update anomalies, compared to the other database where the tables are in lower normal forms (all of them are either not even in 1NF or are in lower normal forms than 3NF).

- TRUE [4]
- FALSE

5. Aggregate functions can be used in a SELECT clause without GROUP BY on a column of a table. [4]

- TRUE
- FALSE

6. Using an example of a table and its attributes, define the concept of a candidate key? [4]

7. Using an example of a table, and the concept of functional dependency, define its primary key (primary key of the example table). [4]

8. Using an example, explain the difference between the full functional dependency and the partial functional dependency. [4]

9. Provide an example of a recursive relationship with one-to-one multiplicity and another example of a recursive relationship with many-to-many multiplicity. [4]

10. Using an example SQL query, explain the purpose and usage of the NOT EXISTS clause. [4]

11. Define the First Normal Form (1NF), the Second Normal Form (2NF) and the Third Normal Form (3NF). Why should we normalize tables in our relational database? [15]

12. Use the following three tables to write the given SQL queries: [15]

- List the names of items (itemName), quantity, date, and value of items (total amount generated from the sale of all the items of a given itemName) sold on January 15, 2003
- List the names of items (itemName), item color (itemColor), which are Brown in color and for which sale has been registered.

Sales

ID	saleno	date	saleText
1	1.00	1/15/2003	Scruff Australian-called himself Bruce
2	2.00	1/15/2003	Man. Rather fond of hats.
3	3.00	1/15/2003	Woman. Planning to row Atlantic-lengthwise!
4	4.00	1/15/2003	Man. Trip to New York-thinks NY is a jungle!
5	5.00	1/16/2003	Expedition leader for African safari

Items

ID	itemno	itemName	itemType	itemColor
1	1	Pocket knife- Nile	E	Brown
2	2	Pocket knife- Avon	E	Brown
3	3	Compass	N	
4	4	Geopositioning system	N	
5	5	Map measure	N	
6	6	Hat - Polar Explorere	C	Red
7	7	Hat - Polar Explorere	C	White
8	8	Boots- snake proof	C	Green

Items

ID	itemno	itemName	itemType	itemColor
9	9	Boots- snake proof	C	Black
10	10	Safari chair	F	Khaki
11	11	Hammock	F	Khaki
12	12	Tent- 8 persons	F	Khaki
13	13	Tent- 2 persons	F	Khaki
14	14	Safari cooking kit	E	
15	15	Pith helmet	C	Khaki
16	16	Pith helmet	C	White
17	17	Map case	N	Brown
18	18	Sextant	N	
19	19	Stetson	C	Black
20	20	Stetson	C	Brown

LineItems

ID	lineno	quantity	linePrice	saleno	itemno
1	1	1	4.50	1	2
2	1	1	25.00	2	6
3	2	1	20.00	2	16
4	3	1	25.00	2	19
5	4	1	2.25	2	2
6	1	1	500.00	3	4
7	2	1	2.25	3	2
8	1	1	500.00	4	4
9	2	1	65.00	4	9
10	3	1	60.00	4	13
11	4	1	75.00	4	14
12	5	1	10.00	4	3
13	6	1	2.25	4	2
14	1	50	36.00	5	10
15	2	50	40.50	5	11
16	3	8	153.00	5	12
17	4	1	60.00	5	13
18	5	1	0.00	5	2

13. Assume we have a table named *EmployeesWorkDetails* that stores information about employees and their work assignments. This table has the following attributes: EmployeeID, EmployeeName, DepartmentID, DepartmentName, ProjectID, ProjectName, StartDate, EndDate, and SupervisorName. **[15]**

- List five functional dependencies that are applicable to the *EmployeesWorkDetails* table.
- Comment on the highest normal form of this table (Is it in 3NF, 2NF, 1NF, or not even in 1NF?). Please explain why.
- If the current data in the *EmployeesWorkDetails* table is not already in 3NF, normalize this table (decompose it) into tables in 3NF.

14. Give an entity Course with the attributes CourseID, CourseName, Credits and Department. Can you model the relationship *Prerequisite* recursively on this entity? Please draw the RDM for this relationship. Write an SQL statement to return the course tuples (Course1 Name, Course2 Name, where Course2 is the prerequisite for course1).

[15]