INSTRUCTION: ANSWER QUESTION (4) AND ANY OTHER TWO FROM **SECTION A** AND ALL QUESTIONS IN **SECTION B**
TIME ALLOWED: 2 $^{1/2}$ HRS

1. a) What is Data Integrity?

    b) How does the DBMS enforce the required data constraint?

    c) What is the difference between the RESTRICT update rule and CASCADE update rule?

    d) Describe the three fundamental problems that could occur if transactions are not properly handled in a multi-user environment.

    e) Explain the term 'Referential Integrity'.

2. a) Explain the different types of locks that can be implemented at various levels in a database, stating the advantages and disadvantages of each implementation.

    b) Explain how a DBMS handles deadlock in a database.

    c) Write the full form of the SELECT statement and explain any of its clauses.

    d) Differentiate the shared lock and the exclusive locking schemes

3. a) Enumerate and briefly explain three (3) advantages and two (2) disadvantages of views.

    b) SQL-based DBMSs provide three different ways of adding new rows of data to a database table. Briefly explain each of these methods.

    c) Explain the meaning of the term 'Privileges'.

    d) List and briefly explain the four basic privileges for tables and views in a database.

4. a) Consider the database which consists of three tables with the following schema:

    Sailors(Sid:integer, Sname:string, Rating:integer, Age:integer)

    Reservations(Sid:integer, Bid:integer, Rday:date)

    Boats(Bid:integer, Bname:string, Colour:string)

    Write the following SQL queries:

    i) Find the age of the youngest sailor.

    ii) Retrieve the names and the Sid's of Sailors who reserved a boat on the following days: 10/10/2012, 10/11/2012 and 12/11/2012.

    iii) Retrieve the names and rating of Sailors who reserved the "Trans-atlantic" boat.

iv) Re-assign all the reservations made by the sailor with Sid 202 to the sailor with Sid 209.

v) Delete the sailor named 'David'.

vi) Create a vertical view of the Sailors Table and called it 'SailorsRating'.

b) Consider the following query:

```
SELECT S.Sname
FROM Sailors S, Reservations R
    WHERE S.Sid = R.Sid
    AND R.Bid = 103
```

   i.   What does the query do?

   ii.   Re-write the query above using a sub-query.

SECTION B

1. What does the following SQL statement do: `SELECT Customer, COUNT(Order) FROM Sales GROUP BY Customer HAVING COUNT(Order) > 5`

2. What is the difference between the `WHERE` and `HAVING` SQL clauses?

3. ACID stands for................?

4. Can we use both `WHERE` and `HAVING` clause in one SQL statement? Yes or No

5. A special stored procedure executed when certain event occurs is called..............?

6. The `JOIN` is a SQL keyword used to ....?

7. If you join a table to itself, what kind of join are you using?

8. Write the SQL statement that will select all records with all their columns from a table called **Sales**.

9. .... is a process preventing users from reading data being changed by other users, and prevents concurrent users from changing the same data at the same time.

10. Write the SQL statement that will selects all rows from table called **Contest**, with column *ContestDate* having values greater or equal to May 25, 2006.

11. What is the purpose of the SQL `AS` clause?

12. What is the purpose of the SQL `BETWEEN` operator ?

13. The organizations responsible for specification of standards for SQL are.............. and ....

14. What type of join is needed when you wish to include rows that do not have matching values?

15. What type of join is needed when you wish to include only rows that do have matching values?

GOODLUCK