Department of CSE, Stamford University Bangladesh
CSI 223: Database Management System
Spring 2023 Final Examination
Full Marks: 5@20=100   **Time: 2:30 Hours**

Mark

1 (a) 'Data is a valuable commodity in this digital era and database is like Commercial Bank (07) Vault to secure the Data' – Justify the statement comparing functions/operations of Bank Vault with Database features/functions.

(b) For any enterprise/company automation, data are stored in a database and end users (07) access through desktop/web based database application. Compare and contrast between two-tier architecture and three-tier architecture of database application. Which one most secure and why?

(c) Different tools, techniques and websites are used/employed/analyzed in the course (06) conduction time. List those mentioning purposes and significances individually. You may also include additional items what you think important in a separate list.

2 (a) 'A major purpose of a database system is to provide users with an abstract view of the (06) data.' Explain different levels of abstraction with pictorial view. Mention different distinct roles/access of different database users.

(b) Consider the relation database for Emplyee_Company dataset holds four tables shown (14) below where the primary keys are underlined.

    Employee (<u>NationalID</u>, Name, Area, City)
    Worker (<u>NationalID</u>, CompanyName, Salary)
    Company (CompanyName, City, MinSalary, MaxSalary)
    Manager (<u>NationalID,</u> CompanyName)

Write the SQL commands for the following queries:
  i) Find the employee (NationalID, Name, Salary) whose salary is the highest.
  ii) Look the companies ordering salary range difference (i.e., MaxSalary-MinSalary).
  iii) Look companywise count of employees.
  iv) Find the Name of the employees who leave same City of Manager.
N.B.: Mention alternate SQLs if a query performs alternately.

3 (a) Suppose three different courses (C1, C2 and C3) were conducted by three instructors (12) (I1, I2 and I3) in a particular semester in Stamford University Bangladesh (SUB). Instructors submitted their evaluations on Performance, MidTerm and FinalExam out of 100 individually. An operator entered the marks creating three tables MarkC1, MarkC2 and MarkC3 having identical structure MarkC*(<u>Roll</u>, Performance, MidTerm, FinalExam), here * indicates course index 1, 2 or 3. University marks distribution for Performance, MidTerm, FinalExam are 30%, 30% and 40%,

respectively. Now authority wants to look combined Result Sheet with subject wise mark out of 100 for the three courses like below.

Roll	Sub1	Sub2	Sub3	Total
10001	50	80	60	190

Design View (One or More) to visible the combined Result Sheet.

(b) Looking the Tables mentioned for Q3(a), a database expert says one single table is enough instead of three individual tables to keep the marks. What will be structure of the single table 'Mark' for the marks of three subjects? Design View (One or More) to visible combined result from the Mark table. (08)

4 (a) Write a stored procedure to prepare Grade Sheet (Shown below) from mark tables MarkC* in Q.3(a). (14)

Roll	Sub1	Sub2	Sub3	GPA
10001	C	A	B	3.0

Consider Letter Grades A, B, C and F for marks =>80%, =>60% and <80%, =>40% and <60%, and <40%, respectively. The grade points for Letter Grades A, B, C and F are 4, 3, 2, 0, respectively.

Modify the Stored Procedure to calculate GPA excluding the failure (i.e., F grade) subjects.

(b) In modern database system, consistency is a great concern. What do you understand about consistency? Explain it with example of operations. (06)

5 (a) Discuss importance of SQL Trigger. Design a sample SQL Trigger to update Garde Table if individual subjects' marks (% marks) entered in a Mark table. For grading follow Q4(a). (07)

Grade Table

Roll	Sub1	Sub2	Sub3	GPA
10001	C	A	B	3.0

Mark Table

Roll	Sub1	Sub2	Sub3	Total
10001	70	80	60	210

(b) Draw ER diagram of your assigned database design. Consider appropriate views, trigger and stored procedures preferable. (14)