UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF SCIENCE (COMPUTER SCIENCE) AND BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

CSC 122/SIT122: DATABASE SYSTEMS

DATE: APRIL 6, 2018   **TIME: 11:00 AM – 1:00 PM**

INSTRUCTIONS:

Answer Question ONE and ANY other two Questions

QUESTION ONE (30 MARKS)

a) Explain the uses of the following SQL functions:

    i)   Mid()   (2 marks)

    ii)   Now()   (2 marks)

b) Briefly describe two of the limitations of manual file systems compared to database management systems.   (2 marks)

c) Perform the following with syntax and a suitable example

    i)   Create a table from existing table.   (2 marks)

    ii)   Insert data in your table from another table.   (2 marks)

d) Discuss with examples about various types of attributes present in the ER model.

    (4 marks)

e) Explain how views are different from tables.   (4 marks)

f) Explain the importance of normalization in database design.   (3 marks)

g) Distinguish between data manipulation language and data definition language in SQL.

    (2 marks)

h) Discuss the types of integrity constraints that must be checked for operations Insert and Delete. (4 marks)

i) Explain the terms primary key, candidate key, alternate and secondary key.

(3 marks)

QUESTION TWO (20 MARKS)

a) Discuss the ACID properties of a transaction. (10 marks)

b) Describe the concept of integrity constraints. Explain the constraints, check, primary key, not null and unique in SQL with an example for each. Give the syntax. (10 marks)

QUESTION THREE (20 MARKS)

a) Explain the concepts of relational data model. Also discuss its advantages and Disadvantages. (10 marks)

b) Explain using examples how a DBMS perform the following functions (8 marks)
   i) Improving data sharing
   ii) Improving data security
   iii) Minimizing data redundancies
   iv) Multiple views

c) For the relation Person(name, address), write a SQL query which retrieves the names of people whose name begins with 'A' and address contains 'Bangalore'. (2 marks)

QUESTION FOUR (20 MARKS)

a) A company has several departments. Each department has a supervisor and at least one employee. Employees must be assigned to at least one, but possibly more departments. At least one employee is assigned to a project, but an employee may be on vacation and not assigned to any projects. The important data fields are the names of the departments, projects, supervisors and employees, as well as the supervisor and employee number and a unique project number.

   i) Identify the entities (2 marks)
   ii) Identify the attributes (3 marks)
   iii) Draw a fully attributed ER-diagram (5 marks)

b) Explain the types of problems that can occur in a multi user environment when concurrent access to the database is allowed. (5 marks)

c) ABC cooperative society wishes to implement a mutli-user, client/server database architecture to serve customers spread across the country. Using examples discuss database components requirements that will meet the organization's objectives. (5 marks)

QUESTION FIVE (20 MARKS)

a) The table below called **product** shows details of products in an inventory system.

Prodnum	Prodname	Quantity	Unit_ price	Supplier_name	Supply_ date
3245	Processing unit	40	25000	ABC computers	8/09/10
7643	Monitor	60	12000	ABC computers	07/10/10
2190	Keyboard	200	600	Umoja solution	12/10/10
4372	Mouse	400	300	IT comm.	3/9/10
8733	Hard disk	60	2400	IT comm.	16/10/10
6754	Modem	120	1500	ABC computers	5/09/10

Write an expression that will extract records that satisfy the following conditions using SQL query statements.

    i) List all products details starting with letter M. (2 marks)

    ii) List all products prodnum, prodname columns of all products with unit prices 25000, 2400,600 and 1500. (2 marks)

    iii) Group all records by supplier name (2 marks)

    iv) List the sum of all products quantity. (2 marks)

    v) List product number, product name and unit price of all product apart from keyboard. (2 marks)

b) Data is a valuable resource that must be strictly protected as with any corporate resource. Describe THREE Threats to data stored in a database and give ONE Mechanisms employed by database management systems to protect data from each of the threats identified.

(6 marks)

c) Describe **TWO** techniques for managing transactions in database. (4 marks)

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