UNIVERSITY OF GHANA

COLLEGE OF BASIC AND APPLIED SCIENCE

SCHOOL OF PHYSICAL AND APPLIED SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

B.A/BSc. FIRST SEMESTER UNIVERSITY EXAMINATIONS: 2017/2018

CSIT 419: ADVANCED DATABASE MANAGEMENT SYSTEMS

(3 CREDITS)

EXAMINER: ERIC KEMEH

TIME ALLOWED: TWO AND A HALF (2½) HOURS

Answer ONE Question from Section A and ANY OTHER 3 Questions from Section B

SECTION A

QUESTION 1 **[25 marks]**

a) Define each of the following key terms:

a. Data

b. Information

c. Database

d. Database application

e. Database system

f. Database Management System

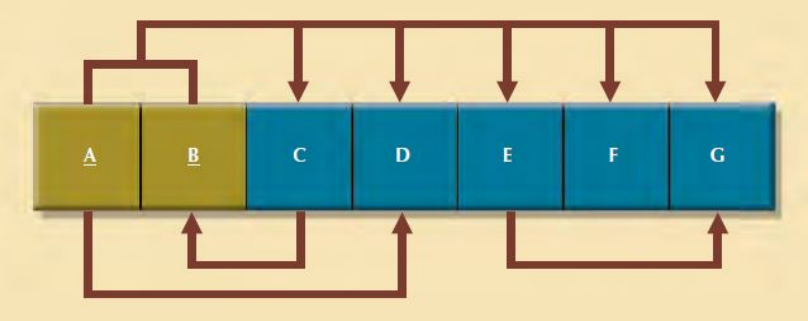
[10marks]

b) Differentiate between DDL and DML

[5 marks]

a) Break up the dependency diagram below to produce a collection of dependency diagrams that are in 3NF and BCNF. Show intermediate stages.

[10marks]



QUESTION 2 **[25 marks]**

a) In SQL, differentiate between **[8 marks]**

I. a subquery and a join

II. WHERE and HAVING clauses

III. DROP and DELETE

IV. LEFT OUTER JOIN and RIGHT OUTER JOIN

a) The tourism department wishes to computerize its data. The information consists of monuments of tourist interest, their location and history. Monuments are classified according to historical, religious and architecture

importance.

The list of facilities available at each sport is also available. These give

(I) living accommodation in terms of hotels, their names, category and the number of rooms available and

(II) local transport facilities in terms of service provider name, tours with their tariff and timing.

Draw an E-R diagram by identifying the entities, relationships, attributes, primary keys connectivities and cardinalities. **[17 marks]**

SECTION B

QUESTION 3 **[25 marks]**

Consider the following tables.

ID	First Name	Last Name	Dept_No	Salary	Date Hired	Country
01	Daniel	van Horn	D01	GH23,764.00	1-Jan-94	Netherlands
21	Daniel	Korowi	D09	GH12,890.00	15-Apr-06	Yemen
13	Richard	Kiwa	D02	GH24,079.00	15-Mar-03	Ghana

Table: EMPLOYEE **Table: DEPT**

Dept_No	Dept_Name	Budget
D01	Accounting	GH20,000
D02	Faculty	GH250,000
D03	Logistics	GH200,000
:	:	"

Write down a single query in SQL for getting each of the following information:

a) Department name and total number of employees in each department who earn more than average salary. **[3 marks]**

b) Increase employees' salary by 10% for all employees who earn less than GH20,000. **[2 marks]**

c) Drop all employees from a country whose name starts with the letter Y. **[2 marks]**

d) Add a currency column called Tax to the Employee table. **[2 marks]**

e) Which department(s) currently have no employees? **[3 marks]**

f) List ID and full name of employees in Personnel department. **[3 marks]**

g) Insert a record for a new employee: name = John Agrovi, ID =66, salary= 12345.67, date hired Dec. 13, 2012 and country Ghana. **[3 marks]**

h) What are the personal details of the employee with the lowest salary? **[3 marks]**

i) How many countries have more than 3 employees come from there. **[4 marks]**

QUESTION 4 [25 marks]

1. The following tables form part of a database held in a relational DBMS

Resort (resortNo, resortName, city, country)

Room (roomNo, resortNo, type, cost, bedQty, bedType) Booking (resortNo, guestNo, dateFrom, dateTo, roomNo) Guest (guestNo, guestName, guestAddress)

where Resort consists of resort details and ResortNo is the primary key. Room contains room details for each resort and roomNo, resortNo form the primary key. Booking contains details of bookings and resortNo, guestNo, dateFrom forms the primary key. Guest contains guest details and guestNo is the primary key.

(i) Identify the foreign keys in this schema. Explain how the entity and referen tial integrity rules apply to these relations.

(I) Produce four sample tables for these relations that observe the relational integrity rules.

(20 marks)

2. Briefly discuss importance of the normalization in the database design.

b. Discuss the problems related to data redundancy.

(5 marks)

QUESTION 5 **[25 marks]**

Assume we have two relations: PEOPLE and MENU and attributes: name, food and day have same domain.

PEOPLE:

	MENU:

a) Write the Relational Algebra expression for each of the following questions:

I. What are the names of people whose names contain the alphabet L? **[2 marks]**

I. Display names and age of people whose food is not available on the menu **[3 marks]**

II. List the foods not chosen by any people **[3 marks]**

B) (i) identify the functions of a DBMS.

ii) Who are the people involved in the database environment? Briefly explain their responsibilities.

[17 marks]

QUESTION 6 **[25 marks]**

1.Study the University Student Affairs case study presented below.

a. In what ways would a DBMS help this organization?

b. What data can you identify that needs to be represented in the database?

c. What relationships exist between the data items?

Data requirements: Students

- Student identification number
- First and last name
- Home address
- Date of birth
- Sex
- Semester of study
- Nationality
- Program of study
- Recent Cumulative Grade Point average (CGPA)

College (A college is an accommodation provided for the students. Each college in the university has the following information)

-College name

-College address

-College office number

-College manager

-Number of rooms

-Room number

Sample query transactions

i. List the names of students who are staying in the colleges

ii. List the number of empty rooms in the colleges

iii. List the names of students within specific CGPA

[20 marks]

2) Identify 2 advantages and disadvantages of database management system.

[5 marks]