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**University Examinations 2014/2015**

…….. YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

**CIT 3326: ADVANCED DATABASE MANAGEMENT SYSTEMS**

**DATE: OCTOBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Define the term object oriented model (OOM). Explain how OOM differs with entity relational model. (4 Marks)
2. Explain any two roles of data visualization tools. (4 Marks)
3. Describe one of the possible problems generated by concurrent access to the same data and illustrate how the problem can be resolved by using the serialization mechanism.(4 Marks)
4. Differentiate between physical and logical data base design. Briefly explain process of transition from logical to physical database. (8 Marks)
5. List advantages of object oriented database as compared to relational database. (4 Marks)
6. Explain two ways of data fragmentation in a distributed environment. (6 Marks)

**QUESTION TWO (20 MARKS)**

Consider the following table definitions: and answer the questions that follow

DIAGRAM

Write SQL statement to do the following:

(i) Provide an alphabetically ordered list of all BIT students (represented by the attribute course). (4 Marks)

(ii) Provide an alphabetically ordered list of all the students and the course unit they enroll in. (4 Marks)

(iii) Supposing that a unit (represented by the attribute Name) can be taken by more than one student, find all the students, who are other courses but taking ‘Programming’.

(4 Marks)

1. Discuss any three roles of database administrator in regards to data recovery. (4 Marks)
2. Describe the two operations by means of which transactions are supported within a DBMS. (4 Marks)

**QUESTION THREE (20 MARKS)**

Study the following real life system, and answer questions that follow

1. Develop an entity relationship (EIR) diagram (12 Marks)

INFANT IMMUNISATION. A system is required to record details of infant immunization in a health region. Every infant in the region is required to have a course of general vaccinations against diseases such as whooping cough and diphtheria. Patients are identified by a unique NHS number and details such as the name, date of birth and NHS number of the parent or guardian of the infant are also recorded. Each vaccination is for a single vaccination type such as mumps, rubella, etc., and is given to a single patient. However, every infant is given number of booster injections or certain vaccination types of periodic intervals. The date of each vaccination is recorded. Vaccination is given by General Practitioners(Gps). A general practice patients on his or her list. Each infant is on the list of only one doctor. Practices are identified by practice names and GPs are identified by unique GP numbers. The name of each doctor and the number of vaccination patients on each doctor’s list also needs to be recorded. Besides general update operations, the following processes must be supported by the system: The production of appointment letters; a work-list by General Practice for a given week; An audit list indicating the number of vaccinations by type conducted during the previous six-month period.

1. Briefly explain how the database could be distributed across multiple point for ease of access. (8 Marks)

**QUESTION FOUR (20 MARKS)**

Consider an E-R diagram of a banking database system as follows:

DIAGRAM

1. Give an appropriate table structures from ER diagram. (6 Marks)
2. Briefly explain any two database recovery methods to be used in case of data loss. (4 Marks)
3. Explain how a deadlock state can be detected and how the system can break such a state. (4 Marks)
4. Explain any three challenges database administrator is likely to encounter if above database is to be distributed across various branches. (6 Marks)

**QUESTION FIVE (20 MARKS)**

1. Discuss two of the problems associated with distributed database systems. (4 Marks)
2. Define the two main approaches to data security. (4 Marks)
3. List and explain any four of Date’s rules for distributed database systems. (8 Marks)
4. Explain use of XML in databases. (4 Marks)