

**IMIS HIGHER DIPLOMA QUALIFICATIONS**

**DATABASE DESIGN  
(H4)**

**Thursday 5<sup>th</sup> June 2014 10:00hrs – 13:00hrs**

**DURATION: 3 HOURS**

**Candidates should answer ALL the questions in Part A and THREE of the five questions in Part B. Part A carries 40% of the marks available and Part B carries 60%. Candidates should allocate their time accordingly.**

***No reference material of any kind may be taken into the examination.***

**[Turn over]**

**PART A. Answer ALL questions in this section****Question A1**

Explain the following advantages and disadvantages as they affect an organisation considering implementing a Database Management System (DBMS).

**Advantages**

- More information for the same amount of data
- Improved data integrity
- Increased concurrency

**Disadvantages**

- Cost of conversion
- Greater impact of failure.

**(5 marks)****Question A2**

Explain the meaning of data independence, particularly logical data independence and physical data independence.

**(5 marks)****Question A3**

Before embarking on designing a database solution to a problem it is advisable for a designer to define the scope and boundaries. Explain what is meant by this, **giving** suitable examples.

**(5 marks)****Question A4**

Explain the difference between the two SQL statements, showing how the insertion of a record might be affected

```
CREATE INDEX INDEX1 ON PRODUCT(PRODUCTNAME)
```

```
CREATE UNIQUE INDEX INDEX2 ON PRODUCT(PRODUCTNAME)
```

**(5 marks)****Question A5**

Explain the function and purpose of a subquery in SQL, giving a suitable example to help your explanation.

**(5marks)****Question A6**

Explain the difference between distributed databases and distributed processing.

**(5 marks)**

**Question A7**

Consider the following SQL table definitions for customers and their accounts at a bank.

```
CREATE TABLE CUSTOMER (
    CUSTNUM CHAR (5) NOT NULL UNIQUE,
    CUSTFNAME VARCHAR (20) NOT NULL,
    CUSTLNAME VARCHAR (20) NOT NULL,
    CUSTPHONE CHAR (12))
    PRIMARY KEY CUSTNUM;

CREATE TABLE ACCOUNT (
    CUSTNUM CHAR (5) NOT NULL,
    ACCNUM CHAR (5) NOT NULL,
    TYPE CHAR (1) DEFAULT "C",
    BALANCE NUMBER (5,2))
    PRIMARY KEY (ACCNUM)
    FOREIGN KEY (CUSTNUM) REFERENCES CUSTOMER;
```

The CUSTOMER table is populated with the following data

CUSTOMER			
CUSTNUM	CUSTFNAME	CUSTLNAME	CUSTPHONE
1	Arnold	Nueba	044571234567
2	Charles	Mwamba	066778882341
3	Blessing	Nwere	998776512345

Which one of the following INSERT statements, for the ACCOUNT table would be successful? Show what the inserted record would look like. If the INSERT's would not be successful explain why not.

- a) INSERT INTO ACCOUNT VALUES (1, 20, ,55.05);
- b) INSERT INTO ACCOUNT VALUES (4, 21, "I", 45.60);
- c) INSERT INTO ACCOUNT VALUES (3, 22, R, 33.33);
- d) INSERT INTO ACCOUNT VALUES (2, , , 123.99);

(5 marks)

**Question A8**

Explain why a Data Warehouse is a good source of data for Data Mining.

(5 marks)

**PART B. Answer any THREE of the following FIVE questions.****Question B9**

- a) A data dictionary or system catalogue is said to contain *meta-data*. Explain the meaning of this term.

**(2 marks)**

- b) Briefly describe SIX items of information that you would expect to find in a data dictionary.

**(6 marks)**

- c) Describe SIX benefits that a data dictionary brings to a database environment.

**(12 marks)**

**(Total 20 marks)**

**Question B10**

- a) Briefly define the term data model.

**(2 marks)**

- b) Explain the following terms as they relate to a data model

- i. Entities
- ii. Attributes
- iii. Relationships
- iv. Constraints
- v. Business rules.

**(10 marks)**

- c) Discuss disadvantages of the Hierarchical **and** Network models and the advantages of the Relational database model that superseded them.

**(8 marks)**

**(Total 20 marks)**

**Question B11**

- a) Database performance tuning can be divided into SQL Performance Tuning and DBMS Performance Tuning. Explain the difference between these two aspects of performance tuning.

(8 marks)

- b) Describe the use of the following in improving performance

- i) Data cache
- ii) SQL cache
- iii) Sort cache

(12 marks)

(Total 20 marks)

**Question B12**

- a) Briefly describe the characteristics of a Distributed Database Management System (DDBMS)

(12 marks)

- b) Contrast homogeneous and heterogeneous DDBMS.

(8 marks)

(Total 20 marks)

**Question B13**

- a) Inmon (1993) defined a data warehouse as a “collection of data” that was

- subject-oriented
- integrated
- time-variant and
- non-volatile

Explain the meaning of each of these four terms.

(12 marks)

- b) Briefly describe **FOUR** problems that might be associated with developing and managing a data warehouse.

(8 marks)

(Total 20 marks)

**END OF EXAMINATION**