



UNIVERSITY EXAMINATION 2014/2015

SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF INFORMATION TECHNOLOGY

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY
VIRTUAL

UNIT CODE: BIT1201

UNIT TITLE: DATABASE SYSTEMS

DATE: DECEMBER, 2014

MAIN EXAM

TIME: 2 HOURS

Instructions to Candidates

- Answer **ALL** Questions in **Section A** and Any other **TWO** from **Section B**.
- Write your registration number on all the answer sheets used.
- Use a **NEW PAGE FOR EVERY QUESTION** attempted, and indicate the question number on the space provided on each page of the answer sheet.
- Fasten together all loose answer sheets used.
- Switch off all Mobile Phones and PDAs..

SECTION A: COMPULSORY QUESTIONS**{30 MARKS}****QUESTION 1**

An old Hierarchical Database Management System (DBMS) is being replaced by a Relational DBMS.

- a) With aid of an example, explain what is meant by a Hierarchical Data Model. [4 Marks]
- b) State Five properties of a relation. [5 Marks]
- c) Explain the terms:-
i. Primary Key. [2 Marks]
ii. Foreign Key. [2 Marks]
iii. Index. [2 Marks]
- d) Explain why no attribute of the primary key of a base relation may be null. [2 Marks]
- e) Differentiate between a database and a database management system. [3 Marks]
- f) Normalize this data up to 3 normal form, showing each form, the dependency graphs and various types of dependencies identified. [10 Marks]

PROJECT NUMBER	PROJECT NAME	EMPLOYEE NUMBER	JOB CLASS	CHARGE PER HOUR	HOURS
22231	CABLING	001	ENGINEER	4500	13
23227	CODING	090	ANALYST	5600	10
22233	DB DESIGN	002	CODER	6000	15

SECTION B: ANSWER ANY TWO QUESTIONS

{20 MARKS EACH}.

QUESTION 2

SPU KAZI LEO AGENCY finds suitable employees for its client companies. The agency holds files of information about companies who are looking for employees, employees who are looking for jobs, and newspapers in which to place advertisements. When potential employees or job seekers look for a job, they apply to the agency for an advertised job in the newspaper. The agency classifies potential employees to be qualified for all jobs of the same type, so they can advise potential employees for similar jobs offered by different companies in the future.

Draw the Entity-Relationship Diagram (ERD) for the above situation; marks are awarded as follows

- a) Identifying the entities for the above scenario. [4 Marks]
- b) Identifying the relationships between entities. [4 Marks]
- c) Showing the primary key and two other attributes only for each entity on the diagram. [4 Marks]
- d) Showing the cardinality of each relationship on the diagram. [4 marks]
- e) Use of proper symbols and notations and diagram flow [4 Marks]

QUESTION 3

- a) There are many protection measures associated with deploying a secure database system. Nevertheless, violations of database security can occur in many situations. Briefly discuss **THREE** security breaches and propose some computer-based countermeasures to protect the database from these breaches in a multi-user computer environment. [12 Marks]
- b) The data administration functions that can be found in a typical database environment are usually performed by two types of administrators: a Data

Administrator and a Database Administrator. Describe, and distinguish between, the roles of each administrator. [6 Marks]

- c) Differentiate between Cardinality of a relation and the degree of a relation [2 Marks]

QUESTION 4

- a) List and explain **Five** Components of Database Management systems environment. [5 Marks]
- b) Discuss various aspects contained in the Data Dictionary [5 Marks]
- c) State **THREE** advantages and **TWO** limitations of Database Management systems in comparison with Flat (traditional) File systems [10 Marks]

QUESTION 5

- a) The main objective of the ANSI SPARC three level architecture is to separate the user views of the database from its physical representation. Using an illustration, describe each of the three levels in this architecture. [15 Marks]
- b) Explain the difference between physical and logical data independence. [5 Marks]

-The End-

