MAASAI MARA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019 ACADEMIC YEAR

SCHOOL OF SCIENCE AND INFORMATION SCIENCES

(REGULAR)

SECOND YEAR SEMESTER II EXAMINATIONS FOR THE BACHELOR OF SCIENCE IN INFORMATION SCIENCE

COURSE CODE: INS 2204
COURSE TITLE: DATABASE CONSTRUCTION

DATE: 26/04/2019　　　　　　　　**TIME: 0830 – 1030HRS**

INSTRUCTIONS TO CANDIDATES

ANSWER Question **ONE** and any other **TWO**

QUESTION ONE (30 MARKS)

a.   The 'database approach is said to have overcome the limitations of the traditional file systems approach'. Qualify this statement

[6 marks]

b.   With the aid of a diagram, illustrate the meaning of program-data-independence, and show how the logical vs. physical data independence is achieved in databases.

[12 marks]

c.   You have been hired as a database administrator with KNA, and your boss has signed a contract for the design and development a database for KNA's archives. Given the following key entities,

i.   The Archive entity set, with attributes; archive_id, archive_name, archive_branch

ii.   The Chief_Archivist entity set, with attributes; c_archivist_id, c_archivist _name, c_archivist _address.

iii.   Archive users entity set, with attributes; a_User_id, a_User _name, a_User _cel, a_User _level.

{Assume each c_achivist is assigned at least one archive_branch, and each branch has its own users; note: Many achivists can work in Many

archive_branches for this case}

Required:

Design a complete E-R-D with 3NF relations, showing your work flow from the above scenario.

[12 marks]

QUESTION TWO (20 MARKS)

a.   Concurrency control is important because the simultaneous execution of transactions over a shared database can create several data integrity and consistency problems. Use possible examples and solutions to address this problem in relations to database design.

[9 marks]

b.   Narok County MM maintains game data using the following entities:

i.   The Wild entity set, with attributes; Wild_id, Wild_name, Wild_location and Wild_gender

ii.   Manager entity set, with attributes; manager_id, manager_name, manager_tel, manager_section.

iii.   The warden entity set, with attributes; warden_id, warden_name (which includes firstname, middlename and lastname), warden_address (which includes warden_home_address and warden_station_address)
{Assuming each warden is assigned a section, each section manned by at least one manager}

Required:
Develop an E-R-D from the above scenario and take all the relations to 3NF to represent the game database above.
                [11 marks]
QUESTION THREE (20 MARKS)
a. i) What do you understand by 'normalization' as used in database construction?
[2 marks]
   ii) Given R is a relation with attributes S, T, U, V, W and X as depicted below; transform R to 3rd normal form while carefully explaining your steps:

R (S, T, U, V, W, X)
[6 marks]

b. A DBMS is the software that interacts with the users' application programs and the database. Using a diagram, illustrate the architectural construction and main components in a DBMS.
                        [12 marks]
QUESTION FOUR (20 MARKS)
Int.Publishers maintains data about their author-agents in a relational database named aintl_db_4 with the following relations;
AUTHOR (Author_id, Firstname, Lastname, Address, Status, Speci_no);
SPECIALIZATION (Speci_no, Speci _name, Author_id);
CHAPTER (Chapt_no, Chapt_name, Speci_no);
WORK_ON (Author_id, Chapt_No, Hours_worked);

 Use SQL commands to query the following from aintl_db_4:
i.   Retrieve the names and addresses of all authors who work on 'religion & government' specialization   [4 marks]
ii.   Retrieve total hours worked by author, sorted in the order of the speci-no, alphabetically by the author's last name
                                [4 marks]

iii. Retrieve the total number of authors in each specialization for those specializations with less than 5 author agents

[6 marks]

iv. Retrieve the chapt_no, chapt_name, and number_of_authors who write the chapters in (i) above from aint_db_4 database.

[6 marks]