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University Examinations 2013/2014

STAGE 2, EXAMINATION FOR DIPLOMA/CERTIFICATE IN INFORMATION
TECHNOLOGY

DIT 0201: DATABASE SYSTEMS

DATE: APRIL 2014

TIME: 1½ HOURS

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

QUESTION ONE - (30 MARKS)

- a) Define the following terms as used in databases.
 - i. Validity integrity (2 marks)
 - ii. Entity integrity (2 marks)
 - iii. Referential integrity (2 marks)
- b) With the aid of diagrams describe the three types of relationships that can be used to link tables in a data base. (3 marks)
- c) Explain the two major classification of database software. (4 marks)
- d) Distinguish between relational database and flat file model. (2 marks)
- e) Explain any four features of database software. (4 marks)
- f) Explain three ways in which a primary key field can be used in a database. (3 marks)
- g) Explain three objectives of normalisation in database. (3 marks)
- h) List any six general field properties that can be set on a field in a table. (3 marks)

- i) Explain two major qualities of a primary key field. (2 marks)

QUESTION TWO – (15 MARKS)

- a) Easy coach is a bus company that offers transport services to the public. The company has decided to keep a database record of the employees. The database contained the following details of employees: name, age, ID no and area of residence.
- i. Write an expression that would be used to compute the year of birth of each employee. (3 marks)
 - ii. Write an expression that would be used to extract employees whose age is above 20 years and below 45 years. (2 marks)
 - iii. For each of the field, allocate the appropriate data type. (4 marks)
 - iv. Mention two ways that would enable you restrict area of residence field to only allow ten characters. (4 marks)
 - v. Write an expression that would extract only those employees whose name start with letter ‘J’. (2 marks)

QUESTION THREE – (15 MARKS)

- a) A real estate agent kept a file of the house details. Several records are shown in the following diagram:

| House No | Area | Type | Feature | Rent (Kshs) |
|----------|-------|-----------|-----------|-------------|
| H008 | West | Bungalow | Pond | 15000 |
| H007 | West | Bungalow | Pool view | 10000 |
| H006 | North | Bedsitter | Waterfall | 5000 |
| H005 | South | Bedsitter | Patio | 2000 |
| H004 | South | Terraced | Pool | 2500 |
| H003 | South | Terraced | Pool | 2500 |
| H002 | North | Bungalow | Waterfall | 2300 |

Required

- i. Which field is most appropriate to use as a key field? Explain your answer. (2 marks)
- ii. Write an expression to extract those houses whose feature ends with letter ‘ I’ (2 marks)
- iii. State a validation check that should be used on the area data as it is entered into the file. (2 marks)
- iv. Write down an expression that would extract all the houses in the south which have a rent less than Ksh.1200. (2 marks)

v. Write an expression to sum the rent for all the houses in west area. (3 marks)

vi. Mention the function of the following field properties if they are specified as below.

| Field property | Specification | |
|----------------|---------------|-----------|
| a) Required | yes | (1 mark) |
| b) Indexed | yes | (1 mark) |
| c) Input mask | 00-0000 | (2 marks) |

QUESTION FOUR (15 MARKS)

- a) Through database management systems, users communicate their requirements to the database using data description Languages (DDL's) and Data manipulation Languages (DML's). Explain any four functions performed by DDL and DML. (4 marks)
- b) Describe any three types of database models. (6 marks)
- c) Explain four components of a database system. (4 marks)
- d) Distinguish between a database schema and a database state. (1 mark)

QUESTION FIVE (15 MARKS)

- a) What is a Data dictionary? List any four contents of a data dictionary. (5 marks)
- b) (i) Define the term control as used in database forms. (2 marks)
(ii) Explain three categories of database controls. (3 marks)
- c) Consider the following six relations for an University database systems:
STUDENT (SSN, Name, Major, Minor, Bdate)
DEPARTMENT (DepartmentName, Location)
COURSE (Course#, Grade, OfferedDepartment)
ENROLL(SSN, Course#, Grade)
Book_ADOPTION (Course#, Book_ISBN)

Required:

- i. Draw the relational schema diagram (5 marks)