TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY
(DICT 13M)

ECS 2201: DATABASE SYSTEMS

END OF SEMESTER EXAMINATION
SERIES: APRIL 2014
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
   - *Answer Booklet*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **FOUR** printed pages

Question One (Compulsory)

Explain the following terms:

      a) Data Dictionary
      b) Entity
      c) View
      d) Schema
      e) Database
      f) Logical Data Independence
      g) Attribute
      h) Distributed database
      i) Relational database
      j) Normalization   **(20 marks)**

Question Two

a) Describe the components of database system   **(8 marks)**

b) Describe characteristics of a DBMS.   **(8 marks)**

c) Explain the following SQL terms and their use: **(4 marks)**
      (i) Distinct
      (ii) Where
      (iii) Having
      (iv) Group by

Question Three

a) Describe advantages of database technology.   **(4 marks)**

b) Describe the characteristics of file based system used to store data.   **(4 marks)**

c) Explain the following levels of database system architecture:
      (i) Conceptual level
      (ii) External level
      (iii) Internal level   **(6 marks)**

d) Explain how DBMS uses the above levels to maintain the physical and logical data independence.
      (4 marks)
e) Briefly explain the process of normalization.   **(2 marks)**

Question Four

a) Describe two-tier database systems, explaining the components of each tier.   **(6 marks)**

b) List any FOUR factors to consider when selecting which DBMS to use.   **(4 marks)**

c) Define the following relation database integrity constraints: **(4 marks)**
      (i) Referential
      (ii) Entity

d) With aid of a diagram, explain the following types of relations:
   (i)   1 to many
   (ii) Many to many
   (iii) Many to 1   **(3 marks)**

e) Explain what you understand by 'Doman Integrity' give an example.   **(2 marks)**

f) State any TWO RDBMS.   **(1 mark)**

Question Five

a) Define the following normal terms:
  (i)   1NF
  (ii) 2NF
  (iii) 3NF   **(3 marks)**

b) List anomalies that may be present in unnormalized relation.   **(3 marks)**

c) The relation Emp-supervisor (Emp#, EmpName, EmpMobile, SupName, SupMobile) as used to store data about employee and supervisor. Each employee is assigned one supervisor. A supervision can supervise more than one employee. The table below shows the instances of occurrence of relation.

Emp Supervisor

Emp#	EmpName	EmpMobile	Sup#	SupName	SupMobile
E001	John K	0722 314251	S001	Mary	0733 445511
E002	Kahindi	0722 004455	S001	Mary	0733 445511
E004	Onyango J	0725 506070	S002	Peter K	0733 446581
E008	Said J	0722 354665	S003	Fatma A	0733 44 5571
E009	Liz Mac	0722 655143	S003	Fatma A	0733 44 6682
E10	Kazungu K	0722 654433	S002	Peter K	0733 44 6581

   (i)   Identify primary key   **(1 mark)**
   (ii) Explain why the Emp supervisor is not in 2NF   **(2 marks)**
   (iii) Normalize the relation   **(5 marks)**

d) The relation below are used to store student data in a college database.

Stud Reg:

Reg No.	Name	Gender	Town	Address
S001	John Kamau	M	Nrb	67821
S002	Peter Kahindi	M	Msa	826789
S003	Fatma S	F	Kilifi	6721
S005	Alice Mganga	F	Voi	321
S007	J. Onyongo	M	Kis	32567
S009	G Otieno	M	Kis	8361

Fee Payment

Reg No.	Date	Amount Paid
S001	01/11/2013	13000
S002	01/11/2013	10000
S005	02/11/2013	6500
S009	03/11/2013	6500
S001	28/11/2013	8000
S002	28/11/2013	9000
S005	29/11/2013	8000
S002	04/01/2014	6000
S001	05/01/2014	8000
S005	05/01/2014	8600
S001	08/01/2014	9200

Write SQL commands to:

(i) Retrieve name of all female student from Mombasa
(ii) Retrieve total fees paid
(iii) Retrieve total fee paid by student 'S002'
(iv) Record 'S007' on 10th November 2013 amount paid was 8,900/-
(v) Change the address of student 'S003' to 8261 and to town to 'Msa'
(vi) Student 'S020' was registered but never paid any fee. Delete his record from the database.

(6 marks)