FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY

DEPARTMENT OF INFORMATION & MEDIA TECHNOLOGY

FIRST SEMESTER 2017/2018 EXAMINATION

COURSE CODE:	CIT 314
COURSE TITLE:	DATABASE SYSTEMS AND CONCEPTS
CREDIT UNITS:	2
TIME ALLOWED:	2 HOURS
COURSE LECTURER:	I. O. ALABI
NUMBER OF QUESTIONS:	5
NUMBER OF PAGES:	3 (INCLUDING THIS PAGE)

INSTRUCTIONS

- Answer all questions
- Do **not** use red pen
- Please use a clear handwriting
- This exam is closed book, closed notes, closed laptop and closed cell phone
- Please use non-programmable calculators only

1. a. Explain how a DBMS implements atomicity and durability properties in ensuring database integrity.

   b. What are the disadvantages of :

   i. serial transactions processing, and

   ii. Concurrent transactions processing.

   c. What are the merits of concurrent transactions processing.

2. a) Briefly explain the following:

   i)   Deadlock   ii) Starvation   iii) Concurrent transactions

   iv)   A transaction

   b) List the ACID properties of database transactions and briefly explain them.

3. What is a lock on a transaction meant for?
      a. Explain Shared lock and Exclusive lock.
      b. Briefly explain with a table to illustrate the compatibility of the two types of locks in 3a) above.
      c) Illustrate the Transaction states with a diagram and brief notes.

4. a) Briefly describe the following terms:
      a.   An entity set   h.   A relationship
      b.   An Attribute   i.   An E-R model
      c.   Null value   j.   Candidate key
      d.   Primary key   k.   Mapping Cardinality
      e.   One-to-one relationship l.   One-to-many relationship
      f.   Entity Integrity   m.   Referential Integrity
      g.   Tuple   n.   Domain

   b) List two reasons why null values might be introduced into a database record.

5. Consider the following relational schemas, where the primary keys are underlined:

          Employee (empno, name, office, age, salary)

          Books (refno, title, author, publisher)

          Loan (empno, refno, date)

   Write the following queries in relational algebra notations:

a) Find the names of employees who have borrowed a book published by FUT-Press. 3

b) Find the names of employees who have borrowed all books published by FUT-press. 3

c) Find the names of employees who have borrowed more than five books published by FUT-press. 3

d) For each publisher, find the names of employees who have borrowed more than five books of FUT-press. 3