TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR DEGREE IN:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
(BTIT 12S)

ICS 2400: TRANSACTION PROCESSING SYSTEMS

END OF SEMESTER EXAMINATION
SERIES: APRIL 2015
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 (Compulsory)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **TWO** printed pages

Question One (Compulsory)

a) Explain any TWO approaches used in database programming **(4 marks)**

b) Explain the FIVE operations that the recovery manager must keep track of **(10 marks)**

c) Explain the following terms:
(i) Transaction
(ii) Business transaction
(iii) Deadlock
(iv) Batch process system
(v) Outline transaction processing system **(10 marks)**

d) Explain the difference between the:
(i) "Single-user database system" and "Multi-user database system"
(ii) **"**Host language" and "data sublanguage" **(4 marks)**

e) State the steps in Query processing **(2 marks)**

Question Two

a) As part of class exercise a lecturer asked fifty students to use a single airtime voucher to top up their Safaricom lines. In the context of this statement:

(i) Define the term "concurrency" **(2 marks)**

(ii) Describe any FOUR types of problems that may occur when transactions are executed in uncontrolled manner **(8 marks)**

(iii) Outline any THREE types of failures that may occur as the students are topping up their credit **(2 marks)**

b) (i) Explain the term "system log" **(2 marks)**

(ii) State any FOUR types of log records **(2 marks)**

Question Three

a) During the end of month of March 2015, a bank realized its entire system was down. A spot check showed that many transactions failed in the middle of execution

In the context of this statement:

(i) Explain the term "Database system recovery" **(2 marks)**

(ii) Explain any TWO reasons why database recovery is needed **(2 marks)**

(iii) Distinguish between "Deferred update and "Immediate update" **(4 marks)**

(iv) Describe any FOUR database recovery techniques **(8 marks)**

b) Two techniques of ensuring serializability exit to ensure non-interference of transaction. Explain them. **(2 marks)**

Question Four

a) A video library is considering installing a "self-checkout" system where customers can borrow videos by scanning their membership cards and videos and by Electronic Funds Transfer and by Electronic Funds Transfer point of sale (EFTPOS)

In the context of this statement:

(i) Outline any FIVE requirements for processing of transactions in the library **(5 marks)**

(ii) Identify any THREE transaction programs that must be developed to have a successful transaction processing. **(3 marks)**

(iii) Using a well-labelled diagram, describe the architecture of the system that will execute the transaction programs **(12 marks)**

Question Five

a) During its execution, a transaction passes through several states until it finally commits or aborts. In the context of this statement:

(i) Outline the properties of a transaction explaining the usefulness of each **(8 marks)**

(ii) List all possible sequences of states through which a transaction may pass **(3 marks)**

(iii) Explain why each state transition may occur in Q4 (a) (ii) **(6 marks)**

b) Explain the following terms:

(i) Embedded SQL

(ii) Impendence mismatch

(iii) Application programming interface **(3 marks)**