



TECHNICAL UNIVERISTY OF MOMBASA

# Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:  
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY  
(BTIT J13)

**ICS 2400: TRANSACTION PROCESSING SYSTEM**

END OF SEMESTER EXAMINATION  
**SERIES: AUGUST 2013**  
**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 **THREE** printed pages

---

**Question One (Compulsory)**

a) Distinguish between the following terms:

- (i) “Business Transaction” and “Transaction Processing”
- (ii) “Batch Processing System” and “Real-time Processing System”

**(8 marks)**

b) State any **TWO** reasons why recovery is required when a transaction is submitted to a database.

**(2 marks)**

c) Using a suitable examples, explain the applications of transaction processing in any **FIVE** business activities/industries.

**(10 marks)**

d) Explain the following terms:

- (i) Structured Query Language

- (ii) Concurrency
- (iii) Application Programming Interface (API)
- (iv) Data Definition Language
- (v) Binary lock **(10 marks)**

### Question Two

- a) With an aid of a diagram, discuss the Transaction Processing System architecture. **(12 marks)**
- b) The following program was written in C programming language to process company database. (Numbers 0 to 7 are line numbers used for the purposes of this program) only.
- ```

1  int loop
2  EXEC SQL BEGIN DECLARE SECTION
3  Varchar dname [16] fname [16], address [31]
4  Char ssn [10], bdate [11], sex [x]
5  Float salary, raise
6  Int dno, dnumber;
7  Int SQL CODE; chair SQLSTATE [6]
8  EXEC SQL END DECLARE SECTION
    
```

With reference to this program,

- (i) Identify the embedded SQL statements in Line 1 and Line 7 **(2 marks)**
- (ii) Write down the regular C program declarations **(4 marks)**
- (iii) Explain the use of variables declared in Line 6 SQLCODE and SQLSTATE **(2 marks)**

### Question Three

- a) Discuss any FOUR requirements for a computer based transaction process necessary for processing business transactions. **(8 marks)**
- b) With an aid of a diagram, discuss the steps of query processing of an airline reservation system. **(12 marks)**

### Question Four

- a) In concurrent execution environment, transaction T1 and T2 may cause conflict over data item. Discuss any THREE concurrency control techniques used to avoid conflict. **(6 marks)**
- b) Recovery from transaction failures means that the database is restored to the most recent consistent state just before the failure. Discuss the TWO main techniques for recovery. **(4 marks)**
- c) There are several possible reasons for transaction to fail in the middle of execution. Discuss any FIVE such reasons. **(10 marks)**

### Question Five

- a) Discuss the following types of problems we may encounter when two transactions run concurrently.
- (i) Lost update problem
  - (ii) Temporary update problem
  - (iii) Incorrect summary problem
  - (iv) Unrepeatable read problem **(8 marks)**

- b) Write down Java statements necessary for importing any five java class libraries for processing SQLJ. **(10 marks)**
- c) Explain the term “serialisability” **(2 marks)**