

**W1-2-60-1-6**

## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**STAGE II SEMESTER III EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENC IN INFORMATION TECHNOLOGY**

**ICS 2400 : TRANSACTION PROCESSING SYSTEMS (TPS)**

**DATE: APRIL 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND**

**ANY OTHER TWO QUESTIONS.**

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**QUESTION ONE (30 MARKS)**

(a) Define the term transaction. [2 marks]

(b) Discuss five components of a TPS and use an example to illustrate their purpose. [5 marks]

(c) Define the following terms as they are used in Transaction Processing Systems: [6 marks]

1. Database server (iv) Session.
2. Concurrent transaction. (v) Serializability.
3. Front-End services. (vi) Deadlocks.

(d) Describe with the aid of workable examples how the ACID properties are maintained in Transaction Processing Systems. [8 marks]

(e) Discuss two ways of scaling UP and two ways of scaling OUT a system with regard to scalability of TPS. [4 marks]

(f) Describe how ***Two-Phase Commit Protocol*** (2PC) can be used to implement atomicity in transaction. [5 marks]

**QUESTION TWO (20 MARKS)**

(a) Discuss four services offered by transaction monitors. [4 marks]

(b) Explain three reasons why a transaction may abort. [3 marks]

(c) Differentiate between ***time-out based detection*** and ***graph based detection***. [5 marks]

(d) Write short notes on the following as relates to distributed TP:

1. Locks. [2 marks]
2. Compensating transaction. [2 marks]
3. Nested transactions. [2 marks]
4. Transaction Queuing Technology. [2 marks]

**QUESTION THREE (20 MARKS)**

(a) When transactions are deadlocked, none of them can proceed unless the system intervenes. Discuss the four possible ways of avoiding deadlocks. [4 marks]

(b) There are many different types of failure that can affect the system processing, each of which has to be dealt with in a different manner. List and explain four such failures and show systems recover from them. [8 marks]

(c) Explain how the ***stateless server concept*** simplifies system scalability and recovery. [2 marks]

(d) Explain how a transaction is executed by a user in internet environment e.g. in online shopping. [6 marks]

**QUESTION FOUR (20 MARKS)**

(a) Explain the four terms as they relate to system logging: [4 marks]

1. Before-image.
2. After-image.

(b) Define the term ***isolation*** in relation to transaction processing and give a relevant example. [5 marks]

(c) There are many victim selection criteria that a deadlock detector can use. Discuss five of them. [5 marks]

(d) Differentiate between the following terms as used in Online Transaction Processing:

1. Front-end and Back-end Services. [2 marks]
2. Stateless versus Stateful servers. [2 marks]
3. Media failure and system crash. [2 marks]