

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

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2018/2019**

**YEAR III SEMESTER I/II EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY/BUSINESS INFORMATION TECHNOLOGY**

**ICS 2404: ADVANCED DBMS**

**DATE: AUGUST 2019 TIME: 2 HOURS**

**INSTRUCTIONS: Answer question one and any other two.**

QUESTION ONE (30 MARKS) (COMPULSORY)

A distributed database is defined as a collection of multiple, logically interrelated databases distributed over a computer network. A distributed database management system (DDBMS) is the defined as the software permits the management of the distributed databases and makes this distribution transparent to users. A distributed database system is referred to as a combination of the distributed database and the distributed DMMS.

a. Describe any five advantages of a distributed database. (5 marks)

b. Describe any four implicit assumptions of a distributed database. (4 marks)

c. Describe any three distinct characteristics of a data warehouse. (3 marks)

d. Distinguish between online transaction processing (OLTP) and online analytical processing (OLAP) (5 marks)

e. Using the relation below, write the SIPL statements to perform the following tasks.

Registration table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Adm no | F name | L name | Course | City | Gender |
| 151200 | Cynthia | Okusimba | BBIT | Nakuru | Female |
| 173500 | Paul | Njoroge | BIT | Eldoret | Male |
| 171209 | Tiffany | Wanjiku | BCOM | Ktiale | Female |
| 163200 | Sharon | Shikuku | HRM | Nairobi | Female |
| 165207 | Jude | Ouma | Medicine | Mombasa | Male |

i. Retrieve all female students. (2 marks)

ii. Extract all male students. (2 marks)

iii. Update the adm-no attribute for Paul Njoroge to 171500. (2 marks)

iv. Insert a new student in the Registration table with the following details.

adm-no: 175600

f-name: Victor

L- name; Semeren

Course: Architectural Design

City: Samburu

Gender: Male (3 marks)

f. Describe any four properties of a transaction. (4 marks)

SECTION B

QUESTION TWO (20 MARKS)

The ANSI-SPARC, is an abstract design standard for a database management system (DBMS first proposed in 1975.

a. Using a diagram, describe the ANSI-SPARC architecture. (5 marks)

b. Describe the various states of a transaction from initialization to its completion.

(4 marks)

c. Describe any three types of concurrency control anomalies. (3 marks)

d. Describe any four necessary conditions for deadlocks. (4 marks)

e. Elaborate any four benefits of database views. (4 marks)

QUESTION THREE (20 MARKS)

a. Using suitable diagrams, describe any four database models. (8 marks)

b. Describe any four reasons for mining data. (4 marks)

c. Describe any four techniques used in mining data. (4 marks)

d. Explain any four reasons that may necessitate database tunning. (4 marks)

QUESTION FOUR (20 MARKS)

a. Describe the components of a database environment. (5 marks)

b. Explain three types of databases based on the number of users. (3 marks)

c. Elaborate any three distinct features of database system. (3 marks)

d. Explain the need for business intelligence in database systems. (4 marks)

e. Describe the various types of failures that may occur in a distributed database management system. (5 marks)

QUESTION FIVE (20 MARKS)

Data replication is the process of storing separate copies of database at two or more sites. It’s a popular fault tolerance technique of distributed databases.

a. Explain any four advantages of data replication. (4 marks)

b. Fragmentation is the task of dividing a table into a set of smaller tables. The subsets of the tables are called fragments.

i. Name and explain any three types of fragmentation. (6 marks)

ii. Explain any three advantages of fragmentation. (3 marks)

c. Distribution transparency is the property of distributed databases by the virtue of which the internal details of the distribution are hidden from the users. The DDBMs designer may choose to fragment tables, replicate the fragments and store them at different sites.

i. Name and explain any seven forms of transparency. (7 marks)