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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR**  
**FOURTH YEAR, FIRST SEMESTER EXAMINATION**  
**FOR THE DEGREE OF BACHELOR OF SCIENCE**  
**(COMPUTER SCIENCE)**

Date: 19<sup>th</sup> April, 2022  
Time: 2.30pm –4.30pm

**KCS 404 - ADVANCED DATABASE SYSTEMS**

**INSTRUCTIONS TO CANDIDATES**

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**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

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**QUESTION ONE (30 MARKS)**

- a) Describe any three database models used to represent data. Use diagrams to aid your description. (6 marks)
- b) Discuss the two types of Distributed Databases giving one example of each (6 marks)
- c) List four DDBMS Application Areas. (4 marks)
- d) Define the term Distributed database. (2 marks)
- e) What is the term API in full and what does it mean as used in databases? (4 marks)
- f) Define the terms;
  - i) Entity set
  - ii) Relationship set (4 marks)
- g) Explain any four advantages of Concurrent Execution of Transactions (4 marks)

**QUESTION TWO (20 MARKS)**

- a) With the help of some explanation, classify the three dimensions of distribution transparency. (9 marks)
- b) Database security must address and protect several things in a DBMS, list five of them. (5 marks)
- c) Highlight three threats to databases. (6 marks)

### **QUESTION THREE (20 MARKS)**

- a) Define the term Threat as used in databases. (2 marks)
- b) The relation of Database Security and the DBA is quite vivid. Describe four types of actions performed by the DBA? (8 marks)
- c) Write the term API in full and what does it mean as used in databases? (4 marks)
- d) Explain the two types of schedules in a DBMS (6 marks)

### **QUESTION FOUR (20 MARKS)**

- a) Highlight the four different recovery techniques available in the Database. (8 marks)
- b) With the aid of an illustration, discuss the states of a transaction (12 marks)

### **QUESTION FIVE (20 MARKS)**

- a) Let us assume a transaction T1 that transfers 500 money from account A to account B. Before transaction let A = 1000 and B = 1000. Represent the transaction using a pseudocode. (7 marks)
- b) State the components of storage manager? (3 marks)
- c) With the aid of a diagram, highlight the steps followed in Database Query Optimization (10 marks)