

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2014/2015**

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

AND

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

**CIT 3326: ADVANCED DATABASE SYSTEMS**

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

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

**QUESTION ONE (30 MARKS)**

1. Define the relational model. What is a relational database management system (3 Marks)
2. Explain the two types of program-data independence on the basis of the three levels ANSI/SPARC architecture of a database system (3 Marks)
3. Describe one of the possible problems generated by concurrent access to the same data (the lost update problem, the uncommitted dependency problem, the inconsistent analysis problem) and illustrate how the problem can be resolved by using the locking mechanism

(4 Marks)

1. Differentiate between data warehousing and data mining (6 Marks)
2. List advantages of object oriented database as compared to relational databases (4 Marks)
3. Explain role of Online Analytical Processing in database applications (4 Marks)
4. Explain based on a diagrammatic representation two possible architectures for database systems (6 Marks)

**QUESTION TWO (20 MARKS)**

Consider the following table definitions: and answer the questions that follow

1. (i) Provide an alphabetically ordered list of all Professors (represented by the attribute position) younger than 50 (3 Marks)

(ii) Provided an alphabetically ordered list of all the lecturers and the modules they teach

(2 Marks)

(iii) Supposing that a subject (represented by the attribute Name) can be taught by more than one lecturer, find all the lecturers, who are not Professors, that teach ‘Programming’; eliminated any possible duplicates (3 Marks)

(iv) Whether the room ‘MB316’ is free on Friday at 4.oopm (4 Marks)

1. Differentiate between transaction and concurrency control (2 Marks)
2. Discuss any three concepts of access control (6 Marks)

**QUESTION THREE (20 MARKS)**

1. Develop an entity relationship (E/R) diagram (12 Marks)

Cinema Land is company which owns a number of cinemas in the Kenya. They require a corporate database to record details of cinemas, venues and takings. Each cinema complex is given a unique code. Other attributes of a cinema include the cinema’s name, its seating capacity, the number of employees, its location and its manager. Cinemas show a number of films over a season. The company currently needs to know which films are showing in which cinemas. Also, they need to know what films have been shown at what cinemas. A venue is a showing a given film at a given cinema. Each venue has a start date and an end date. The company wishes to record the entire takings for each venue and the total number of people attending each venue

1. Briefly explain how the database could be transformed to a physical database architecture

(8 Marks)

**QUESTION FOUR (20 MARKS)**

1. Discuss two of the problems associated with distributed database systems (4 Marks)
2. Define the two main approaches to data security (4 Marks)
3. List and explain any four of Date’s rules for distributed data base systems (8 Marks)
4. Explain use of XML in databases (4 Marks)

**QUESTION FIVE (20 MARKS)**

Consider an E-R diagram of a banking database system as follows

1. Transform the database into an object oriented database (6 Marks)
2. Briefly explain any two database recovery methods to be used in case of data loss

(4 Marks)

1. Explain how a deadlock state can be detected and how the system can break such a state

(4 Marks)

1. Explain three advantages of object oriented database systems (6 Marks)