(*Knowledge for Development*)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS

2020/2021 ACADEMIC YEAR

MAIN EXAMINATIONS

YEAR TWO SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF

BACHELORS OF SCIENCE

(INFORMATION TECHNOLOGY)

COURSE CODE: BIT 212

COURSE TITLE: INTRODUCTION TO DATABASES

DATE: 18/06/2021 **TIME: 2.00 P.M. – 4.00 P.M.**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) [30 MARKS]

a) What is the difference between a Database system and DBMS? **[2 Marks]**

b) What is data independence and why is it important? **[3 Marks]**

c) Explain TWO limitations of File-based Systems. **[4 Marks]**

d) A schema defined for Employee Management System is:

Employee: EmpID, Name, Address, Department, Designation, Salary
Department: DepartID, DepartName, HeadID

i. State the Entities present within the Employee Management System. **[2 Marks]**

ii. State two primary keys that would be appropriate for the relations stated in (i) above. **[2 Marks]**

iii. Explain how you would enforce entity integrity and referential integrity in the database above. **[4 Marks]**

iv. Write SQL statement for the following:

I. Retrieve the details of employee who gets the maximum salary. **[4marks]**

II. List names of all employee who earn more than KSH. 200,000 **[4 Marks]**

III. Give the name of the employee who heads the department where employee with EmpID 3 works. **[5 Marks]**

QUESTION TWO [20 MARKS]

a) What do you understand by the term concurrency control as used in transaction management? **[2 Marks]**

b) What is the difference between a shared lock and exclusive lock? **[2 Marks]**

c) Discuss two main concurrency control techniques that allow transactions to execute safely in parallel subject to certain constraints. **[6 Marks]**

d) I) what is a deadlock as applied to database transactions? **[2 Marks]**

II) Explain **THREE** deadlock control techniques? **[6 Marks]**

III) Which of the above deadlock control techniques would you recommend in the event:

i. The probability of a deadlock occurring is high? **[1 Mark]**

ii. The probability of a deadlock occurring is low? **[1 Mark]**

QUESTION THREE [20 MARKS]

a) What is meant by the term data abstraction as used in databases? **[2 Marks]**

b) Discuss **THREE** Levels of data abstraction. **[6 Marks]**

c) Explain the two types of data independence in databases **[4 Marks]**

d) Explain your understanding of the following E-R Model Basic Concepts

i. Entity sets **[2 Marks]**
ii. Relationship sets **[2 Marks]**
iii. Attributes. **[2 Marks]**
iv. Multi-valued Attribute **[2 Marks]**

QUESTION FOUR [20 MARKS]

a) Discuss **FIVE** components of the database system environment **[10 Marks]**

b) Explain **FIVE** advantages of Database Approach **[10 Marks]**

QUESTION FIVE [20 MARKS]

a) Consider the following database table and answer the questions that follow:

Table – Worker

WORKER_ID	FIRST_NAME	LAST_NAME	SALARY	JOINING_DATE	DEPARTMENT
001	Monika	Arora	100000	2014-02-20 09:00:00	HR
002	Niharika	Verma	80000	2014-06-11 09:00:00	Admin
003	Vishal	Singhal	300000	2014-02-20 09:00:00	HR
004	Amitabh	Singh	500000	2014-02-20 09:00:00	Admin
005	Vivek	Bhati	500000	2014-06-11 09:00:00	Admin
006	Vipul	Diwan	200000	2014-06-11 09:00:00	Account
007	Satish	Kumar	75000	2014-01-20 09:00:00	Account
008	Geetika	Chauhan	90000	2014-04-11 09:00:00	Admin

i) From the table, give an example of a tuple and an attribute value. **[2 Marks]**

ii) What is the data type of the attribute 'JOINING_DATE'? **[2 Marks]**

b) Write an SQL query to create the table shown above. **[3 Marks]**

c) Implement a Query to insert the first-row data into worker table. **[4 Marks]**

d) Write an SQL query to fetch "FIRST_NAME" from Worker table using the alias name as <WORKER_NAME>. **[3 Marks]**

e) Write an SQL query to fetch "FIRST_NAME" from Worker table in upper case. **[3 Marks]**

f) Write an SQL query to fetch unique values of DEPARTMENT from Worker table. **[3 Marks]**