

CHUKA UNIVERSITY
SECOND YEAR SECOND SEMESTER EXAMINATIONS FOR THE BACHELOR OF
EDUCATION SCIENCE

COSC 251: DATABASE DESIGN AND IMPLEMENTATION

INSTRUCTIONS:

- Answer Question **ONE** and any other **TWO** questions from section B.
- Diagrams should be used whenever they are relevant to support an answer.

SECTION A: COMPULSORY

QUESTION 1: [30 MARKS] COMPULSORY

- a. Outline FOUR disadvantages of databases in business (4 marks)
- b. Explain FIVE advantages of network database model (5 marks)
- c. Why is it important to undertake cardinality of relationship in databases, hence outline THREE cardinalities of relationship (6 marks)
- d. Explain FIVE features of DBMS (5 marks)
- e. You have been called upon to develop strategies for database security, identify FIVE factors that you would put in place when developing the security strategies (5 marks)
- f. Using an example, explain FIVE SQL database development constraints (5 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 2: [20 MARKS]

- a) Explain the importance of the following files in oracle databases (6 Marks)
 - i) Control files
 - ii) Archive log files
 - iii) Parameter files
- b) below is information provided by a college to aid in developing their database, use it to answer the questions below:-
 - A college contains many departments
 - Each department can offer any number of courses
 - Many instructors can work in a department
 - An instructor can work only in one department
 - For each department there is a Head

- An instructor can be head of only one department
- Each instructor can take any number of courses
- A course can be taken by only one instructor
- A student can enroll for any number of courses
- Each course can have any number of students

- i) Draw an ER diagram of the above information, (6 marks)
- ii) Add cardinality of the relationships to the ER diagram above (5 marks)
- iii) Explain TWO types of attributes that can be used when developing an ER diagram. (3 marks)

QUESTION 3: [20 MARKS]

- a) A student was called upon to develop a database. He quickly developed an un-normalized table, and noted several redundancies as shown in the table below.

Project Code	Project Title	Project Manager	Project Budget	Employee No.	Employee Name	Department No.	Department Name	Hourly Rate
PC010	Pensions System	M Phillips	24500	S10001	A Smith	L004	IT	22.00
PC010	Pensions System	M Phillips	24500	S10030	L Jones	L023	Pensions	18.50
PC010	Pensions System	M Phillips	24500	S21010	P Lewis	L004	IT	21.00
PC045	Salaries System	H Martin	17400	S10010	B Jones	L004	IT	21.75
PC045	Salaries System	H Martin	17400	S10001	A Smith	L004	IT	18.00
PC045	Salaries System	H Martin	17400	S31002	T Gilbert	L028	Database	25.50
PC045	Salaries System	H Martin	17400	S13210	W Richards	L008	Salary	17.00
PC064	HR System	K Lewis	12250	S31002	T Gilbert	L028	Database	23.25
PC064	HR System	K Lewis	12250	S21010	P Lewis	L004	IT	17.50
PC064	HR System	K Lewis	12250	S10034	B James	L009	HR	16.50

- i) Describe the term normalization (2 marks)
- ii) Normalize the above table to 3NF and correct the redundancies on the resultant tables (12 marks)
- b) Using examples, explain THREE categories of database concurrency control mechanisms (6 marks)

QUESTION 4: [20 MARKS]

- a) Using relational database sketches and SQL extracts in each case, explain how the following operations affect a relational database.
- i. Intersection

- ii. Join
- iii. Insert
- iv. Update (12 marks)

- b) Differentiate between the following database terminologies
- i) Database schema and database model
 - ii) Logical data independence and physical data independence (8 marks)

QUESTION 5: [20 MARKS]

- a) Outline THREE entity set keys usable in relational database development. (6 marks)

- b) Write SQL statements to perform the following operations

- i) Create database CLIENTS (1marks)
- ii) Create table CUSTOMES with the following fields and characteristics (6 marks)

- ID (primary key and progresses as 1,2,3,4, etc.)
- NAME (accepts up to 20 characters)
- AGE (number without decimal points)
- ADDRESS (accepts up to 25 of any character)
- SALARY (number with decimal points)

N/B: ID, NAME, and AGE cannot be null values

- iii) Populate CUSTOMER table in b(ii) above with records as shown below (5marks)

ID	NAME	AGE	ADDRESS	SALARY
1	Ramesh	32	Ahmedabad	2000.00
2	Khilan	25	Delhi	1500.00
3	kaushik	23	Kota	2000.00
4	Chaitali	25	Mumbai	6500.00
5	Hardik	27	Bhopal	8500.00

- iv) After developing the CUSTOMER table as shown in b(iii) above, a database administrator erroneously executed a command below:-

```
UPDATE CUSTOMER
SET ADDRESS ='pune', SALARY = 1000.00
```

Explain the changes that were made in the CUSTOMER table above (2 marks)