

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
COMPUTER SCIENCE**

ACSC 351: INTRODUCTION TO DATABASES

STREAMS: BSC COMP. SCI.

TIME: 2 HOURS

DAY/DATE: MONDAY 16/12/2024

2.30 P.M – 4.30 P.M.

SECTION A: COMPULSORY

QUESTION 1: [30 MARKS] COMPULSORY

- a. Differentiate between the following terms as used in relational database
 - i) Tuple and attribute (2 marks)
 - ii) Foreign key and primary key (2 marks)
 - iii) Partial and transitive dependencies (3 marks)

- b. A student normalized her tables up to BCNF normalization. Explain FIVE items that the normalization had solved (5 marks)

- c. Explain FIVE security features of DBMS (5 marks)

- d. Discuss FOUR properties of a transaction (4 marks)

- e. Outline FIVE functions of database administrator (5 marks)

- f. Explain the difference between distributed and parallel DBMS (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION**QUESTION 2: [20 MARKS]**

- a) below is information provided by a sales company to aid in developing their database, use it to answer the questions below:-

A salesperson may manage many other salespeople. A salesperson is managed by only one salespeople. A salesperson can be an agent for many customers. A customer is managed by one salespeople. A customer can place many orders. An order can be placed by one customer. An order lists many inventory items. An inventory item may be listed on many orders. An inventory item is assembled from many parts. A part may be assembled into many inventory items. Many employees assemble an inventory item from many parts. A supplier supplies many parts. A part may be supplied by many suppliers.

- i) Draw an ER diagram of the above information, (7 marks)
 ii) Add cardinality of the relationships to the ER diagram above (4 marks)
 iii) Write an SQL code for the above database (add at least two attributes to every entity, one of the attributes being a suitable primary key) (9 marks)

QUESTION 3: [20 MARKS]

- a) Outline FOUR SQL miscellaneous data types

(4 marks)

- b) Using an example of a many-to-many cardinality of relationship, explain how do you resolve a many-to-many relationships during normalization (5 marks)
- c) Outline THREE concurrency control mechanisms (3 marks)
- d) 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. Normalize the above table to BCNF and correct the redundancies on the resultant tables (8 marks)

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

QUESTION 5: [20 MARKS]

- a) Explain THREE advantages of RAID 6 over RAID 3 data storage (6 marks)
- b) Discuss how each of the following features enhance database security: -
- i) Check pointing (2 marks)
 - ii) Passwords (2 marks)
 - iii) Creating views (2 marks)
 - iv) User roles and privileges (2 marks)
- c) Using examples, explain THREE categories of database concurrency control mechanisms (6 marks)

QUESTION 4: [20 MARKS]

- a) Using an SQL code example, explain UNION clause (5 marks)
- b) Describe TWO data independence in databases (4 marks)
- c) With the help of sample ER diagrams, distinguish between strong and weak entities (5 marks)

- d) Outline the requirements that were given to the database designer, in order to come up with the ER diagram below.

(6 marks)

