CHUKA   **UNIVERSITY**

SUPPLEMENTARY/ SPECIAL EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 351: INTRODUCTION TO DATABASES

STREAMS: BSC (ACSC)   **TIME: 2 HOURS**

DAY/DATE: WED NESDAY 03/02/2021   **11.30 AM – 1.30 PM**

INSTRUCTIONS:

- Answer Question **ONE** and any other **TWO** questions.
- Diagrams should be used whenever they are relevant to support an answer.
- This is a closed book exam, no reference materials are allowed in the examination room
- All mobile phones in an examination room must be switched off.

SECTION A: COMPULSORY

QUESTION 1: [30 MARKS] COMPULSORY

a. Using an example, explain the following categories of data types

    i)   simple data type   (2 marks)

    ii)   complex data type   (2 marks)

    iii)   specialized data type   (2 marks)

b. With the help of a diagram explain RAID-5 data storage system   (5 marks)

c. Outline FOUR advantages of networked database models.   (4 marks)

d. 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)

e. Explain FIVE types of queries used in SQL databases   (5 marks)

f. During the development and usage of databases, there are a number of persons who are involved in the database environment. Highlight the usage of FIVE persons found in the database environment.   (5 marks)
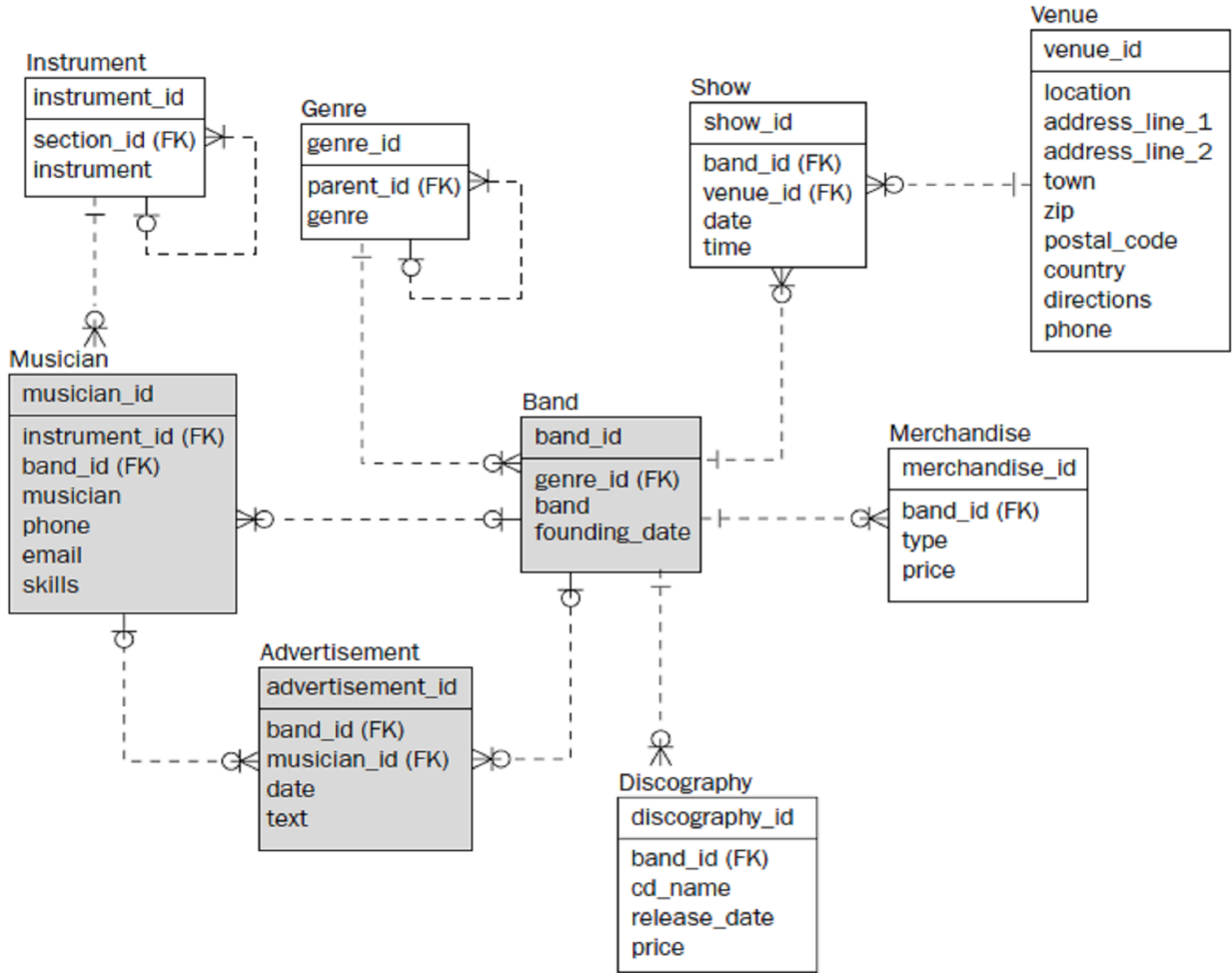
SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 2: [20 MARKS]

a) Using sketches in each case, explain the following map operations on databases.

    i)   Equijoin   (2marks)

    ii)   Product   (2marks)

    iii)   Intersection   (2marks)

b) Explain THREE conditions for a table to have been normalized to 2nd Normal form have.
                    (6 marks)

c) With reference to database redundant relationships

    i)   Explain what are redundant relationships   (2marks)

    ii)   Outline TWO conditions for a redundant relationship   (4 marks)

    iii)   Using a simple ER diagram explain how one solves the problems of a redundant relationship   (2marks)

QUESTION 3: [20 MARKS]
A student developed a database model below, which was to be used to develop a certain musical band database.

i) Are the tables in the model normalized? If not explain an instance that needs
normalization   (2 marks)
ii) Write SQL code for developing the database   (18 marks)

QUESTION 4: [20 MARKS]

a) With reference to normalization, answer the following questions.

i) Using a drawing of a single un-normalized table, with about 4 fields and 6 tuples,
illustrate the concept of multiple valued dependencies, and Update anomaly.
(6 marks)

ii) Correct the table above to remove the anomalies.   (3marks)

iii) Write an SQL code to come up with the above table without anomalies.
(4marks)

b) Using a single diagram in a school environment; illustrate the instance of generalization, specialization, and inheritance (7 marks)

QUESTION 5: [20 MARKS]

a) Explain FIVE file operations that could be done on database files (5 marks)

b) Explain FIVE types of attributes that can be found in a database (5 marks)

c) Outline FIVE logical operators found in SQL (5 marks)

d) Write the steps of designing a query using design view in Microsoft access (5 marks)