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MAIN EXAMINATION

JANUARY – APRIL 2022

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

REGULAR PROGRAMME

DIT 003: DATABASE SYSTEMS

Date: APRIL 2022	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and any TWO Questions	

1. Define null in relational model and list three reasons for its occurrence. **(4 Marks)**
   b.   Identify **TWO** types of database schema as used in database. **(4 Marks)**
   c.   State **FOUR** major properties of database management system. **(4 Marks)**
   d.   Describe **THREE** types of database models. **(3 Marks)**
   e.   Explain the following terms as used in databases **(5 Marks)**
      i.   Schema
      ii. Relation
      iii. Cardinality
      iv. Candidate key
      v.   Attribute
   f.   Briefly describe the process of designing a database **(10 Marks)**

2.
   a) Outline **THREE** limitations of File management systems **(3 Marks)**

   b) Describe any **FOUR** benefits any organization would enjoy for implementing the database approach information system over file based approach. **(4 Marks)**
   c) Discuss **TWO** importance of database normalization **(2 Marks)**
   d) Explain **FOUR** types of attributes in a database. **(4 Marks)**

   e) Differentiate between a database schema and a database instance **(2 Marks)**

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f) With the aid of a well labeled diagram describe the ANSI/SPARC Architecture
   As used in Database Management System. **(5 Marks)**

3.
   a) Describe data independence and explain why it is lacking in the file based approach.

   (2 Marks)
   b) List any **FOUR** functions of DBMS. **(4 Marks)**

   c) Differentiate between the following:
      i. An object and a class in the object oriented data model **(2 Marks)**
      ii. Candidate key and Primary key **(2 Marks)**

   d) Define the following terms.
      i. Denormalization
      ii. Third Normalization form **(4 Marks)**
   e) Using suitable example, describe **TWO** scenarios where a view can be helpful in a database
      management system. **(5 Marks)**
   f) Which command will you use to view the available databases or tables **(1 Mark)**

4. a) Describe the **THREE** components of an Entity Relationship Model and illustrate each
      with examples. **(6 Marks)**
   b) A given train operates one and only one route while for a given route, we can have more
      than one train operating. Passengers can book one or many trains while a given train can
      be booked by more than one passenger. Information that can be kept regarding booking
      included the passenger, train they have booked, date of booking and the seat booked.
      Required:
      Represent the above information using an Entity Relationship Diagram.
      (4 Marks)
   c) Define specialization hierarchy and state its importance. **(3 Marks)**
   d) Differentiate between Data Manipulation Language and Data Definition Language
      queries.
      (2 Marks)

   f) Given the table person below, write appropriate SQL statement to:
         i. add two rows of data to it.
         ii. add a primary key to the relation
   Person **(5 Marks)**

Field	Type	null	Key	Default	Extra
person_id	+ smallint(5)				
fname	+varchar(10)				
lname	varchar(10)				
age	int(6)				
gender	char(2)				

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5.   a)   Briefly explain **TWO** types of Database Management System (DBMS)
                                                              (4 Marks)

    b)   Highlight **TWO** benefits of DBMS   **(2 Marks)**

    c)   State **FOUR** mapping cardinalities used in Entity relationship**.**   **(2 Marks)**

    d)   Briefly explain the terms below as used in relational database model.
                                                              (4 Marks)

        i.   Tuple
        ii.   Relational Key

    e)   Highlight four benefits associated with Data modelling   **(8 Marks)**

END

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