NATIONAL SCHOOL OF BUSINESS MANAGEMENT

B.Sc. in Software Engineering / Computer Networks / Computer Security (Plymouth University, UK)

B.Sc. in Management Information Systems/ Software Engineering (UGC)

B.Sc. in Information Technology (Victoria University)-19.2

1st Year 1st Semester Examination

CS105.3 – Database Management Systems

Instructions to Candidates

1) This paper consists of 2 sections. Answer ALL questions.
2) Time allocated for the examination is three (03) hours.
3) Total number of pages - Nine (09)
4) If a page or a part of this question paper is not printed, please inform the Supervisor immediately.
5) Write your index number in all pages of answer script.
6) Staple all answer sheets at the end of the examination.

SECTION A: Multiple choice questions. Please mark your answer on the marking grid.
Total: 50 Marks (2*25)

1. Software that defines a database, stores the data, supports a query language, produces reports and creates data entry screens is a:
   A) data dictionary
   B) database management system (DBMS)
   C) decision support system
   D) relational database

2. The separation of the data definition from the program is known as:
   A) data dictionary
   B) data independence
   C) data integrity
   D) referential integrity

3. When building a database, the data dealing with an entity is modeled as a:
   A) attribute
   B) class
   C) object
   D) table

4. In a Hierarchical model records are organized as:
   A) graph
   B) list
   C) links
   D) tree

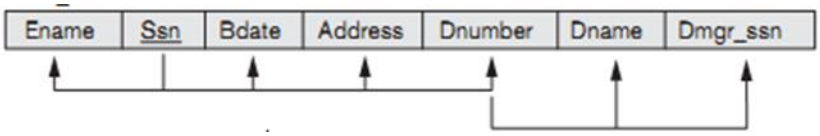
5. Feature of the relational model is that there
   A) is no need for primary key data.
   B) is much more data independence than some other database models.
   C) are explicit relationships among records.
   D) are tables with many dimensions.

6. What is a relationship called when it is maintained between one entity?
   A) Unary
   B) Binary
   C) Ternary
   D) N-ary

7. In the _____ normal form, a composite attribute is converted to individual attributes.
   A) First
   B) Second
   C) Third
   D) Fourth

8. A functional dependency between two or more non-key attributes is called
   A) Transitive dependency
   B) Partial transitive dependency
   C) Functional dependency
   D) Partial functional dependency

Consider the following schema to answer question 9,10 and 11:



9. Prime attribute/s that can be identified in the schema

   A) Ssn and Dnubmer
   B) Dmgr Ssn and Ssn
   C) Ssn
   D) Dnumber

10. The following schema is in 3NF.

   A) True
   B) False

11. If the schema is in 3NF the schema also in 2NF.

   A) True
   B) False

12. …… is a full form of SQL.

   A) Standard query language
   B) Sequential query language
   C) Structured query language
   D) Server side query language

13. The language used in application programs to request data from the DBMS is referred as

   A) DML
   B) DDL
   C) CDL
   D) SDL

14. Which of the syntax is correct for insert statement?

   i) insert into <table_name> values <list of values>
   ii) insert into <table_name> (column list) values <list of values>

   A) i-only
   B) ii-only
   C) Both of them
   D) None of them

15. Which of the following is not an aggregate function?

   A) Avg
   B) Sum
   C) Between
   D) Min

16. To eliminate duplicate rows …… is used

   A) NODUPLICATE
   B) ELIMINATE
   C) DISTINCT
   D) None of these

17. For 'LIKE' predicate which of the following is true?
    i) % matches zero or more characters.
    ii) _ matches exactly one character.

    A) i-only
    B) ii-only
    C) Both of them
    D) None of them

18. On executing DROP command, if you get an error "foreign key constraint" – what does it say?
    A) Data is present in the other table
    B) Table is empty
    C) Foreign key not defined
    D) Connectivity Issue

19. A _____ integrity constraint requires that the values appearing in specified attributes of any tuple in the referencing relation also appear in specified attributes of at least one tuple in the referenced relation
    A) Domain
    B) Referential
    C) Primary Key
    D) Referencing

20. Which one of the following is a set of one or more attributes taken collectively to uniquely identify a record?
    A) Candidate Key
    B) Foreign Key
    C) Alternate Key
    D) Super Key

21. ..... and ……. used to find the number of values in a column and the average value.
    A) TOTAL, AVG
    B) COUNT, AVG
    C) CAL, AVG
    D) SUM, AVG

22. The statement in SQL which allows to change the definition of a table is
    A) Alter
    B) Update
    C) Create
    D) Select

23. The _____ operator is used to compare a value to a list of literals values that have been specified.
    A) BETWEEN
    B) ANY
    C) IN
    D) ALL

24. …… clause is generally used when you have attribute columns combined with aggregate functions in the SELECT statement.
    A) GROUP BY Clause
    B) HAVING Clause
    C) FROM Clause
    D) WHERE Clause

25. Which of the following query will work without any errors?

QUERY A:

```
SELECT *

FROM tblMoney

HAVING Sum(CASH) > 500
```

QUERY B:

```
SELECT *

FROM tblMoney

WHERE Sum(CASH) > 500
```

A) QUERY A
B) QUERY B
C) BOTH A and B
D) None of the quires will work

SECTION B: Structured Essay Questions. **Total: 50 Marks**

1. ***Following questions will test your knowledge on database concepts, ER diagrams and normalizations.*** **(Total= 30 Marks)**

A. Discuss the advantages of using the database approach as compared to the traditional file processing approach. (3 marks)

B. Consider the following sample table and data definitions. Identify the current Normal Form that the table is in. Then normalize the table to the highest normal form. (10 marks)

Table Name: PurchaseOrder

PO-NO	PO-DATE	EMP-CODE	SUPP-NO	SUPP-NAME	PART-NO	PART-DESC	PART-QTY
111	01012001	M2	222	AC Stores	P1	Nut	10
					P2	Bolt	5
					P3	Nail	3
					P5	Screw	6
112	01012001	S3	105	I Hardware	P2	Bolt	2
					P5	Screw	1
113	02012001	S1	111	BC Trading	P1	Nut	3
					P3	Nail	4
114	02012001	M2	150	DO Service	P6	Plug	5
115	03012001	S1	222	AC Stores	P7	Pin	8
116	04012001	S1	100	LM Centre	P8	Fuse	2

ATTRIBUTE	TYPE	LENGTH	DESCRIPTION
PO-NO	N	3	Unique purchase order (PO) number. Many parts can be ordered in one PO
PO-DATE	D	8	DDMMYYYY date when PO written
EMP-CODE	C	2	Unique code of employee who wrote the PO
SUPP-NO	N	3	Unique number assigned to supplier
SUPP-NAME	C	20	Supplier name
PART-NO	N	2	Unique number assigned to each part
PART-DESC	C	10	Part description
PART-QTY	N	2	Quantity of parts ordered in given PO

C. Consider the following scenario related to a private hospital located in Homagama area.

Patients are assigned to a ward on admittance and each ward is occupied by many patients. Patients requiring surgery can book an Operating Theatre. A patient can book one Operating Theatre at a time but the same Theatre can be booked by many patients for surgeries. A Nurse may be either assigned to several wards or to one Operating Theatre at a given time. Wards and Theatres can have more than one nurse assigned. A doctor is assigned to one ward at a time. He/she can also be assigned to an Operating Theatre on certain days. Wards and Theatres can have more than one doctor assigned. The senior doctors (Consultants) usually supervise all the work of the junior doctors.

The database will keep track of following data
For each Patient:
BHT Number (unique), Name, Address, Telephone Number, DOB and Nature of Illness.

For each Doctor:
Doctor ID (unique), Name, Address, Telephone No, Qualifications (a doctor may have several qualifications), specialization, Grade and Service Start Date.

For each Nurse:
Staff ID (unique), Name, Address, Telephone No, Grade, Service Start Date and Salary.

For each Ward:
Ward Number (unique), Ward Name, Ward Type and No. of Beds.

For each Theatre:
Theatre ID (unique), Theatre Type and Special Equipment Available (a theatre can have many special equipment).

The Hospital also wants to keep track of the number of overtime hours a nurse worked in each ward.

a) Draw an Entity Relationship (ER) diagram to represent the above database, stating clearly any assumptions made. (12 marks)
b) Derive the database schema that corresponds to the ER diagram drawn. (5 marks)

2. *Following questions will test your knowledge on MySQL* **(Total= 20 Marks)**

A. Consider the following specification and develop 2 tables based on the given specification. (5 marks)

Creative Visual Company maintains a DB called “Movies”. This DB contains following 2 tables with the given specification.

Table 1: Movie_Titles

MovieID- INT-PK

MovieName- Varchar- 45-This cannot be Null

MovieRatingLevel-INT- This cannot be Null (E.g. 1,2,3,4, or 5)

MovieReleaseDate- Date-This can be Null

MovieDirector- Varchar- 45-This cannot be Null

Table 2: Movie_Display

MovieHallID-INT-PK

MovieID- INT-FK

MovieHallName- Varchar- 20-This cannot be Null

MovieHallLocation- Varchar- 25-This can be Null

MovieTicketPrice-INT- This cannot be Null

Write queries for following requirements:

A. Insert 3 records to each table. (3 marks)
B. Movie hall owners planned to increase the ticket price by 10%. You’re required to add a new temporary column to the Movie_Display table called “MovieTicketNEWPrice” and store the new value of the ticket. (2 marks)
C. Fetch records from Movie_Display table where movie hall is in following cities: Colombo, Kandy, Galle, Kurunegala. (2 marks)
D. Fetch records from Movie_Titles table where movie is directed by “Christopher Nolan” and rated above level 4. (2 marks)
E. Select MovieHallID and MovieID from the Movie_Display table with highest MovieTicketPrice. (2 marks)
F. Delete Movie_Display table from the DB. (2 marks)
G. What is the output/outcome if you try to execute query in 'F’? (2 marks)

---------- ***End of the Paper*** ----------

INDEX NO:

CIRCLE THE CORRECT ANSWER

1	**A**	**B**	**C**	**D**
2	**A**	**B**	**C**	**D**
3	**A**	**B**	**C**	**D**
4	**A**	**B**	**C**	**D**
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17	**A**	**B**	**C**	**D**
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19	**A**	**B**	**C**	**D**
20	**A**	**B**	**C**	**D**
21	**A**	**B**	**C**	**D**
22	**A**	**B**	**C**	**D**
23	**A**	**B**	**C**	**D**
24	**A**	**B**	**C**	**D**
25	**A**	**B**	**C**	**D**