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**Diploma in Information & Communication Technology**

**NVQ Level 05 –Semester I**

**Database Systems I – Theory**

**K72T001M01**

**Three Hours**

**Answer only 05 questions including Question 01 and 02**

**Question 01**

Construct an ER diagram to model a database for the given information.

Suppose that you are designing a schema to record information about reality shows on TV. Your database needs to record the following information:

- For each reality show, its name, genre, basic\_info and participants name. Any reality show has at least two or more participants.
- For each producer, the company name, company country. A show is produced by exactly one producer. One producer produces exactly one show.
- For each television, its name, start year, head office. A television may broadcasts multiple shows. Each show is broadcasted by exactly one television.
- For each user, his/her username, password, and age. A user may rate multiple shows and a show may be rated by multiple users. Each rating has a score of 0 to 10.

(Marks 20)

**Question 02**

The following tables form part of a database held in a relational DBMS.

Hotel (hotelNo, hotelName, city)

Room (roomNo, hotelNo, type, price)

Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)

Guest (guestNo, guestName, guestAddress)

Hotel contains hotel details and hotelNo is the primary key. Room contains room details for each hotel and (roomNo, hotelNo) forms the primary key. Booking contains details of the



bookings and (hotelNo, guestNo, dateFrom) forms the primary key and Guest contains guest details and guestNo is the primary key.

Write the following queries in SQL using above relations:

- 1.) Find hotel name and city of all hotels. (Marks 02)
- 2.) Find the names and addresses of all guests who are living in London, alphabetically ordered by name. (Marks 06)
- 3.) Find all double or family rooms (type = 'D' or 'F') with a price below Rs 25000.00 per night, in ascending order of price. (Marks 07)
- 4.) Find the bookings for which no 'dateTo' has been specified. (Marks 05)

### Question 03

- 1.) List two data manipulation (DML) commands in SQL. (Marks 02)
- 2.) Discuss two characteristics of DBMS. (Marks 06)
- 3.) Compare two differences between File system and DBMS. (Marks 06)
- 4.) Give a brief note on the term data independence in the context of relational databases. (Marks 06)

### Question 04

- 1.) Illustrate three schema architecture in brief. (Marks 06)
- 2.) Normalization is a process within logical design. What is the general goal of normalization? (Marks 04)

3.)

Product ID	Colour	Price
1	red, green	15.99
2	yellow	23.99
3	green	17.5
4	yellow, blue	9.99
5	red	29.99

Product\_Table

(a) “This table is not in first normal form”. Evaluate this statement.

(Marks 04)

(b) How do we bring this table into first normal form?

(Marks 06)

### Question 05

1.) Discuss two reasons to use the Entity Relationship (ER) Diagrams?

(Marks 03)

2.) Contrast DELETE and TRUNCATE commands?

(Marks 05)

3.) Consider relation  $R=(A,B,C,D)$  with the following Functional Dependencies (FDs)

$AB \rightarrow C, C \rightarrow D$  and  $D \rightarrow A$

a. List all candidate keys of R.

b. Is R in 3NF? or BCNF?

(Marks 06)

4.) Define Denormalization?

(Marks 06)

### Question 06

A Product table of a database is given below.

Attribute Name	Description	Data type	Primary Key/ Foreign Key
PCODE	Product Code	CHAR(10)	Primary Key
PDESC	Product Description	CHAR(35)	
PINDATE	Stocking Date	DATE	
POH	Units Available	INT	
PMIN	Minimum units	INT	
PPRICE	Product Price	DECIMAL(8,2)	
PDISC	Discount Rate	DECIMAL(4,2)	
SCODE	Supplier Code	INT	Foreign Key

Here, a supplier may supply many products and some suppliers do not yet supply products. For example, a supplier list may include potential suppliers. If a product is supplied by a supplier, that product is supplied only by a single supplier. Some products are not supplied by a supplier. For example, some products may be produced “in-house”.

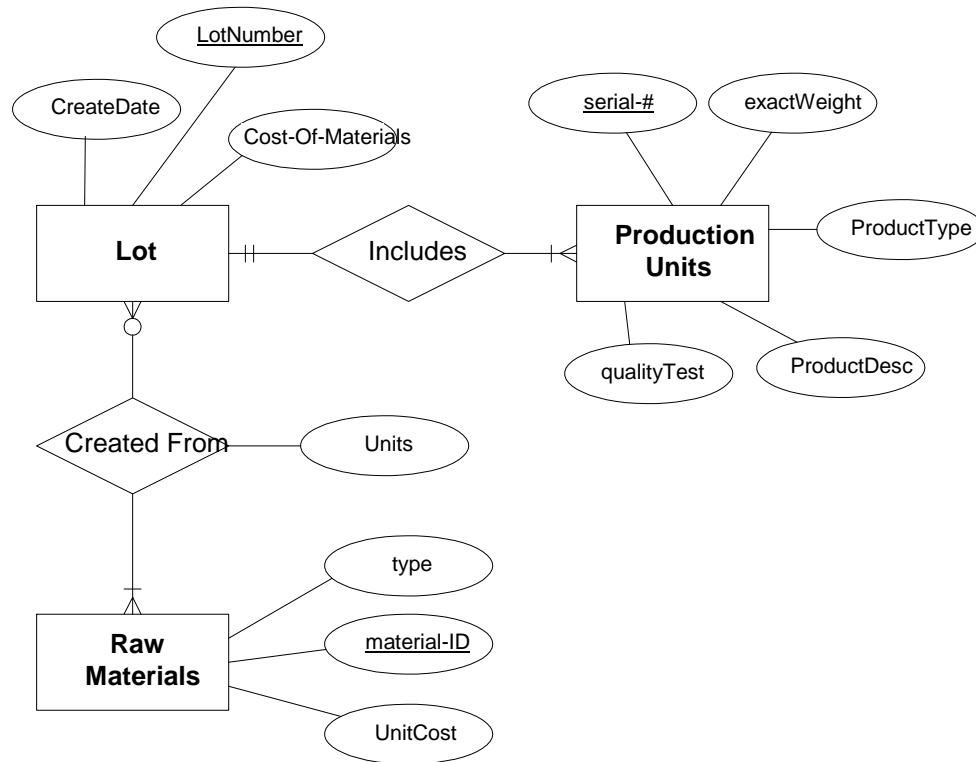
Part of the Product table is given below.

PCODE	PDESC	PINDATE	POH	PMIN	PPRICE	PDISC	SCODE
060001	Power painter	03-May-06	8	5	Rs.7000.00	0.05	25595
062113	Saw blade	13-Jun-06	32	12	Rs. 950.00	0.03	21333
069344	Metal screw	15-Jun-06	18	6	Rs.1400.00	0.00	23444

- 1.) Write the SQL code that will create the table structure for above table. (Marks 08)
- 2.) Write the SQL code that will enter the first two data rows into the table (Marks 06)
- 3.) Suppose that 20 units of product 069344 have been ordered and they have just arrived. Write the SQL code to update the required table to show the new arrivals. (Marks 06)

### Question 07

Production tracking is important in many manufacturing environments (e.g., the pharmaceuticals industry, children's toys, etc.). The following ER diagram captures important information in the tracking of production. Specifically, the ER diagram captures relationships between production lots (or batches), individual production units, and raw materials.



Convert the ER diagram into a relational database schema. Be certain to indicate primary keys and referential integrity constraints. (Marks 20)