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R. V. COLLEGE OF ENGINEERING

Autonomous Institution affiliated to VTU

V Semester B. E. Examinations Nov/Dec-18

Computer Science and Engineering

DATABASE DESIGN

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

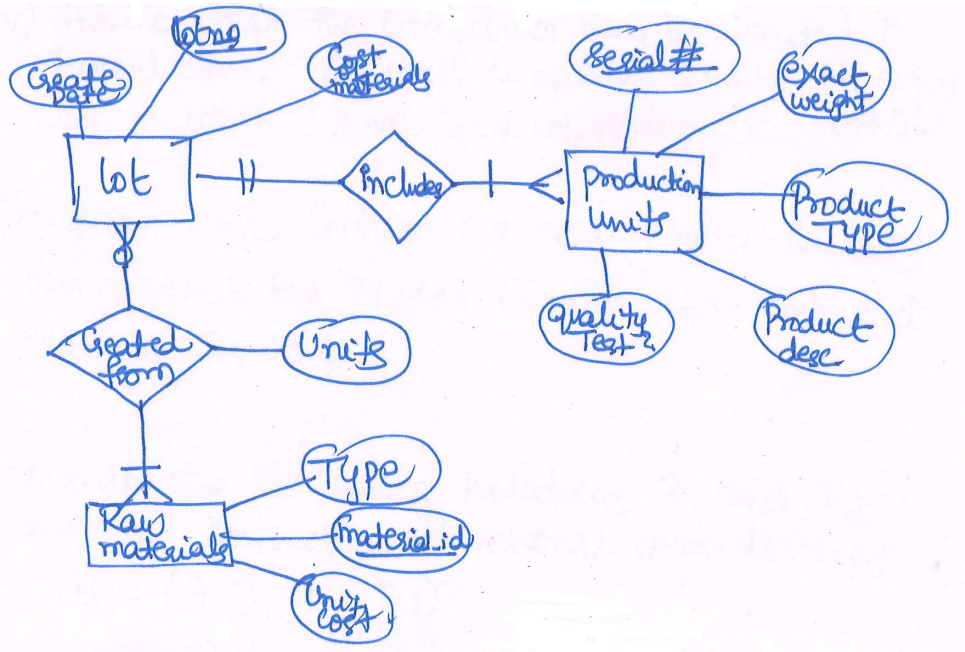
1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B.In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

PART-A

1	1.1	_____ is a collection of programs that enables users to create and maintain a database.	01
	1.2	Define data abstraction.	01
	1.3	The processes for transforming requests and results between levels are called _____.	01
	1.4	What is participation constraint?	01
	1.5	Differentiate between $SELECT$ operation and $PROJECT$ operation.	02
	1.6	Give the general syntax of ALTER command.	02
	1.7	Mention the function of $EXISTS$ in SQL.	01
	1.8	_____ is a constraint between 2 sets of attributes from the database.	01
	1.9	When do you say that any two sets of functional dependency are equivalent?	01
	1.10	give any two conditions for satisfying a set of functional dependencies to be minimal.	02
	1.11	State Boyce – Codd Normal Form ($BCNF$).	01
	1.12	When do you say schedule is said to be cascadeless?	01
	1.13	A binary lock can have _____ and _____states.	02
	1.14	_____ is a name of a field or property.	01
	1.15	Elastic search uses _____ as the serialization format for documents.	01
	1.16	_____ is specified using a $JSON$ request body.	01

PART-B

2	a	Mention the important characteristics of the database approach versus the file processing approach. Explain any two with suitable examples.	08
	b	Sketch with a neat diagram, the database system environment by clearly mentioning the $DBMS$ component modules. Explain in brief.	08
3	a	List and explain the various characteristics of the relations used in Relational Data Model.	07

	b	Consider the following *ER* diagram for the manufacturing environments used for tracking of production. It shows relationship between production lots, individual production units and raw materials. i) Convert the *ER* diagram into a relational database schema. Indicate primary keys and referential integrity. ii) Identify an attribute in the *ER* diagram that represents a composite attribute and explain how.  **OR**	09
4	a	Summarize the different *JOIN* operations used in the relational algebra with appropriate examples for each.	06
	b	Consider the following relation schema: *employee* (*employee_name*, *street*, *city*) *works* (*employee_name*, *company_name*, *salary*) *company*(*company_name*, *city*) *manager*(*employee_name*, *manager_name*) Give an expression in *SQL* for each of following queires: i) Find the names, street address and cities of residence for all employees who work for "First Bank Corp" and earn more than *Rs* 10,000 ii) Find the names of all employees in the database who live in iii) Find the same cities as companies for which they work iv) Find the names of all employees in the database who do not work for "First Bank Corp". Assume that all people work for exactly one company. v) Find the name of the company that has the smallest payroll. vi) Assume that the companies may be located in several cities. Find all companies located in every city in which "Small Bank Corporation" is located.	10
5	a	Compare and contrast between Nested Queries and Correlated Nested Queries. Give relevant examples for each.	08

	b	Consider the following relations $R_1 and\ R_2$ and the respective functional dependencies $R_1 = (A_1, B_1, C_1, D_1)$ $A_1B_1 \rightarrow C_1, C_1 \rightarrow D_1$ and $D_1 \rightarrow A_1$ and $R_2 = (A_2, B_2C_2, D_2)$ $A_2 \rightarrow B_2, B_2 \rightarrow C_2, C_2 \rightarrow D_2$ and $D_2 \rightarrow A_2$ i) List all the candidate keys of R_1 and R_2 ii) What is the highest normal form of R_1 and R_2? Explain how?	08
		OR	
6	a	With the help of an appropriate example, describe the second Normal Form and Third Normal Form.	08
	b	Give the Formal definition of Multivalued dependency. List and explain in brief the various inference rules for functional and multivalued dependencies.	08
7	a	Mention and explain in brief the different command line tools in MongoDB.	08
	b	Define document. Explain Document Metadata, retrieving a document with example.	08
8	a	Define Timestamp in concurrency control. Write and explain the timestamp ordering algorithm.	07
	b	State and explain the *ARIES* Recovery algorithm with an example.	09