

R.V.COLLEGE OF ENGINEERING
 (Autonomous Institution Affiliated to VTU)
 V Semester B.E
 Model Question paper
DATABASE MANAGEMENT SYSTEMS
 (Common to CS, CD ,CY, IS, and AI)

Time: 03 Hours

Maximum Marks: 100

Instructions to Candidate:

1. Answer all questions from PART-A. PART-A questions to be answered in first three pages of the answer book.
 2. Answer question 2 and any one question from 3 and 4, any one question from 5 and 6, any one question from 7 and 8 AND any one question from 9 and 10
- PART-B.**

Question No	Part-A	Marks																																
1	Define canned transactions. Which database user is responsible to develop specifications for canned transactions?	02																																
2	List out all the characteristics of DBMS approach.	02																																
3	<table><tr><td>X1</td><td>Y1</td><td>X2</td><td>Y2</td></tr><tr><td>HH</td><td>T</td><td>SS</td><td>Y</td></tr><tr><td>SS</td><td>Y</td><td>RR</td><td>S</td></tr><tr><td>FF</td><td>J</td><td>JJ</td><td>K</td></tr><tr><td>RR</td><td>S</td><td>BB</td><td>J</td></tr><tr><td>DD</td><td>B</td><td>AA</td><td>F</td></tr><tr><td></td><td></td><td>JJ</td><td>W</td></tr><tr><td></td><td></td><td>EE</td><td>G</td></tr></table> <p>In the above relations, perform the set operations (Union, Intersection and Minus) and display the tuples.</p>	X1	Y1	X2	Y2	HH	T	SS	Y	SS	Y	RR	S	FF	J	JJ	K	RR	S	BB	J	DD	B	AA	F			JJ	W			EE	G	02
X1	Y1	X2	Y2																															
HH	T	SS	Y																															
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RR	S	BB	J																															
DD	B	AA	F																															
		JJ	W																															
		EE	G																															
4	Specify the ER notations for the different categories of attributes.	01																																
5	For the relation schema R(A,B,C,D,E,F,G,H,I) with FDs $F = \{ A \rightarrow BC, B \rightarrow CD, HB \rightarrow I, F \rightarrow H, D \rightarrow F \}$ find $\{AB\}^+$	02																																
6	Mention the type of constraint specified by join dependency.	01																																
7	Does Elastic Search have a schema? Justify your answer.	01																																
8	What is Document Oriented database?	01																																
9	List out the desirable properties of transactions.	02																																
10	Differentiate between serial and nonserial schedules.	02																																
11	Why is it desirable to have concurrent execution of multiple transactions?	02																																
12	How does a DBMS detect and resolve deadlocks?	02																																

Part-B

- | | | |
|-----|--|---|
| 2a. | Define the three schema architecture. Why the mappings are required between schema levels? How do different schema definition languages support this architecture? | 4 |
| 2b. | Differentiate between partial participation and total participation with example. | 4 |
| 2c. | Explain the various functional components of a DBMS with the help of suitable diagram. | 8 |
| 3a. | Consider the following set of requirements for a MOVIE database in which data is recorded about the movie industry and draw an ER diagram for this application. | |

- Each movie is identified by title and year of release. Each movie has a

length in minutes. Each has a production company, and each is classified under one or more genres (such as horror, action, drama, and so forth). Each movie has one or more directors and one or more actors appear in it. Each movie also has a plot outline. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.

- Actors are identified by name and date of birth and appear in one or more movies. Each actor has a role in the movie.
- Directors are also identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie (including one that he or she may also direct).
- Production companies are identified by name and each has an address. A production company produces one or more movies.

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- 3b. Discuss the entity integrity and referential integrity constraints. Why each is considered important?

06

OR

- 4a. Generate the relational algebra for the following queries considering the following tables of a database.

Hotel(hotelNo,hotelName,city)

Room(roomNo,hotelNo,type,price)

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

Guest(guestNo,guestName,guestAddress)

- i) List all single rooms with a price below Rs.2000 per night.
- ii) List the names and address of all guests.
- iii) List the price and type of all rooms at the Sagar hotel.
- iv) List all guests currently staying at the Sagar hotel.
- v) List all hotels.

10

- 4b. Discuss the DIVISION operation. How is it represented, and what are the requirements of the numerator and denominator relations? Explain with an example.

03

- 4c. Identify the Candidate Keys and Super Keys in the following relation schemas.

SALE(Salesperson_id,Serial_no,Date,Sale_price)

SALESPERSON(Salesperson_id,Name,Phone)

03

- 5a. Consider the following schema:

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Suppliers(Sid:integer,Sname:string,address:string)

Parts(Pid:integer,Pname:string,color:string)

Catalog(Sid:integer,Pid:integer,cost:real)

Write the following queries in SQL.

- i) Find the names of the suppliers who supply some red part.
- ii) Find the Sid's of suppliers who supply some red or greenpart.
- iii) Find the Sid's who supply some red part or are at 221 Parker street.

- 5b. Consider the relation scheme $R = (A, B, C, D, E, F, G, H, I, J, K, L)$ with the set of functional dependencies $FD = \{ \{AB\} \rightarrow \{C\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{E, I, J\}, \{B\} \rightarrow \{K, L\}, \{K\} \rightarrow \{L\} \}$. Determine the key of R and decompose R into 2NF and 3NF relations.

08

OR

- 6a. Discuss Project-Join normal form with an example.
- 6b. Differentiate between trivial and non-trivial Multivalued dependency with an example.
- 6c. How are operators IN, EXISTS, UNIQUE, ANY and ALL used in writing

04

04

	nested queries? Write queries for each with an example.	08
7a.	Consider a database with objects X and Y and assume that there are two transactions T1 and T2. Transaction T1 reads objects X and Y and then writes object X. Transaction T2 reads objects X and Y and then writes objects X and Y.	
	i) Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-read conflict.	
	ii) Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a read-write conflict.	
	iii) Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-write conflict.	
	iv) For each of the three schedules, show that Strict 2PL disallows the schedule.	10
7b.	Demonstrate two phase locking techniques used for concurrency control.	06
	OR	
8a.	Explain the transaction states with the state diagram	04
8b.	Why Concurrency control is needed? Demonstrate with an example.	06
8c.	Check whether given schedule is serializable or not using precedence graph. Explain with algorithm.	
	S1:R1(X) R2(Z) R1(Z) R3(X) R3(Y) W1(X) W3(Y) R2(Y) W2(Z) W2(Y)	06
9a.	Define Tokenizer and index in Elastic Search?	04
9b.	List out the key features of MongoDB NoSQL database.	04
9c.	Discuss the Hadoop distributed architecture	08
	OR	
10a.	Explain the following types of data with example	
	i) Structured,	
	ii) Semi structured	
	iii) Unstructured	08
10b.	Discuss the Mongo DB CRUD operations with an example database application.	08