B.E. Fifth Semester (Computer Science & Engineering) (C.B.S.)

Database Management System

P. Pages : 3 **NKT/KS/17/7351**

Time : Three Hours * 0 0 5 1 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.

1. a) Define the following terms: **7**

i) Data Model.

ii) Database schema.

iii) Database state.

iv) Internal Schema.

v) Conceptual Schema.

vi) External Schema.

vii) Data Independence.

b) Consider the following relations for a database that keeps track of auto sales in a car dealership. (Option refer to some optional equipment installed on an auto): **7**
CAR (Serial_No, Model, Manufacturer, Price)
OPTIONS (Serial_No, Option_Name, Price)
SALES (Sales person_id, Serial_No, Date, Sales price)
SALESPERSON (sales person_id, Name, Phone)
Specify the foreign keys for this schema, stating any assumptions you make. Next, populate the relations with a few example tuples, and then give an example of an insertion in the SALES and SALESPERSON relations that violates the referential integrity constraints and of another insertion that does not.

OR

2. a) What are the draw-backs of file processing system? **5**

b) Describe the different types of Languages and their functions in database system. **5**

c) What is significance of view? Also mention its syntax in SQL. **4**

3. a) Describe with suitable example in relational algebra. **8**

i) Union

ii) Natural Join

iii) Intersection

iv) Set difference.

b) Convert the following relational algebra into SQL queries :- **5**

i) $\pi_A(R)$

ii) $\sigma B = 17^{(R)}$

iii) $R \times S$

OR

4. a) What do you mean by relational calculus, Explain domain and tuple calculus. **7**

b) Describe any three aggregate function and any three string function in SQL. **6**

5. a) What is multivalued dependency? Compare 4NF with 5NF. **7**

b) Compute the closure of the following set F of FD's for the relation R = (A, B, C, D, E) where **6**

$\{ A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

$\}$

List all candidate key of R.

OR

6. a) What do you mean by primary and secondary indexing? Also explain sparse and dense Indexing. **7**

b) Construct B^+ for the following set of key value {1, 4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42} having n = 4 and n = 6. **6**

7. Solve the following (Solve **any four**).

i) Pipelining & Materialization. **3**

ii) Indexed nested loop Join. **3**

iii) Block nested loop Join. **3**

iv) Query processing. **4**

v) Sorted Merge Join. **3**

vi) Query optimization & its various techniques. **4**

OR

8. a) Explain how heuristic optimization is performed with example. **7**

b) Discuss the main cost components and type of information that are used in cost function for query execution. **6**

9. a) Explain concept of Transaction with properties. **8**

b) Explain the term of shadow paging with example. **5**

OR

10. a) Explain concept of serializability. **8**

b) Explain the term schedule and transaction with one example. **5**

11. a) Describe different types of failures that occurs in the system? How they are recovered. **7**

b) What is buffering? Explain role of operating system in buffer management. **7**

OR

12. Write short note on : **any four.**

i) Distributed database. **4**

ii) Web database. **3**

iii) Checkpoints / save points. **3**

iv) Data warehouse. **3**

v) Data mining. **4**

vi) Recovery in database. **3**

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