

B.E./B.TECH. Degree Examination, December 2020

Third Semester

IT18305-Database Systems

(Regulation 2018)

Time: Three hours

Maximum: 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Which of the following format is supported by MongoDB?
 - a) SQL
 - b) XML
 - c) BSON
 - d) All of the mentioned
2. Data items grouped together for storage purpose are called a _____.
 - a) record
 - b) title list
 - c)list
 - d)string
3. For a weak entity set to be meaningful, it must be associated with another entity set, called the _____.
 - a) Identifying set
 - b) Owner set
 - c) Neighbor set
 - d) Strong entity set
4. B-tree of order n is an order-n multiway tree in which each non-root node contains _____.
 - a) at most $(n - 1)/2$ keys
 - b) exact $(n - 1)/2$ keys
 - c) at least $2n$ keys
 - d) at least $(n - 1)/2$ keys
5. State the importance of query optimization.
6. Differentiate Multi-valued dependency and Functional dependency.
7. Compare embedded SQL and dynamic SQL.
8. Compare Multimedia databases with temporal databases.

PART B - (4 X16 = 64 marks)

09. (a) Consider a student registration database with the following schema for questions 9a and 9b. **(16)**

Student:

Student Number	Student Name	Address	Telephone
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Course:

Course Number	Description	Hours	Professor Number
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Professor:

Professor Number	Name	Office
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Registration:

Student Number	Course Number	Date
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Consider a suitable sample of tuples for the above-mentioned tables and write DML statements (SQL) to answer the queries listed below:

- i) Which course does a specific professor teach?
- ii) What courses are taught by two specific professors?
- iii) Who teaches a specific course and where is her/his office?
- iv) For a specific student number, display the student name and the courses he/she has registered.
- v) Who are the professors for the specific student?
- vi) Who are the students registered in a specific course?

(OR)

- (b) (i) Create a cursor to modify the salary of 'Professors' belonging to all departments by 75%. **(8)**
 - (ii) Create a trigger that automatically inserts 'Student Number' value into 'Student' table whenever a new student is registered with 'Registration' table. **(8)**
10. (a) Assume a video library maintains a database of movies rented out. Without any normalization all information is stored in one table as shown below. **(16)**

Normalize the below table to 3NF.

Full name	Physical address	Movies rented	Salutation
Janet Jones	First street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.
Robert Phil	3 rd street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.
Robert Phil	5 th Avenue	Clash of the Titans	Mr.

(OR)

- (b) Production tracking is important in many manufacturing environments (e.g., the pharmaceuticals industry, children's toys, etc.). Develop an ER diagram that captures important information in the tracking of production. Specifically, the ER diagram must capture relationships between production lots (or batches), individual production units, and raw materials. **(16)**

11. (a) Consider the following schedule S of transactions T1, T2, T3 and T4. **(16)**
 T2: R(Y); T2: R(X); T3: R(X); T3: commit; T1: W(X); T2: W(Y); T2: R(Z); T2: commit; T4: R(X); T4: R(Y); T1: W(Z);
 T1: commit; T4: commit.

Find out whether schedule S is Conflict serializable and/or S is recoverable and/or S is cascadeless schedule.

(OR)

- (b) Consider the following schedule: **(16)**

T_1	T_2
$R(A)$ $R(B)$ $R(C)$	
	$R(A)$ $R(B)$ $P: \underline{\hspace{2cm}}$
$Q: \underline{\hspace{2cm}}$	
	$R(C)$

Find out the possible values of P & Q for which the above schedule is allowed under Thomas write rule but not under basic timestamp ordering protocol if timestamp $(T_2) > \text{timestamp}(T_1)$

12. (a) Compare and contrast different hashing techniques. **(16)**

(OR)

- (b) Compare and contrast different indexing techniques. **(16)**