Total No. of Questions : 8]

SEAT No. : [ ]

P805

[Total No. of Pages : 2

[5870]-1125
T.E. (Computer Engineering)
DATABASE MANAGEMENT SYSTEMS
(2019 Pattern) (Semester-I) (310241)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

Q1) a) Explain 3NF and BCNF and give its example. Also enlist their differences. **[8]**

b) What are the desirable properties of decomposition? Explain it with example. **[9]**

OR

Q2) a) Explain partial and transitive dependencies with example. **[8]**

b) Explain why database normalization is required for good relational database design? Explain with example requirements of different normal forms like 1NF, 2 NFand 3NF. **[9]**

Q3) a) What is conflict serializability? How to check schedule is conflict serializable schedule. Give one example. **[9]**

b) During execution, a transaction passes through several states, until it commits or aborts. List all possible sequence of states through which transaction may pass. Explain the situation when each state transition occurs. **[9]**

OR

Q4) a) Consider the following two transactions: **[9]**

```
T31: read(A);
     read(B);
     if A = 0 then B:=B+1;
Write (B)
T32: read(B);
     read(A);
     if B= 0 then A: = A+1;
     write (A).
```

Add lock and unlock instructions to transactions T31 and T32, so that they observe the two phase locking protocol. Can the execution of these transactions result in a deadlock?

P.T.O.

b) To ensure atomicity despite failures we use Recovery Methods. Explain in detail log based recovery method. **[9]**

Q5) a) Explain following NOSQL database types with examples and also state the scenario where it is useful **[9]**

i) Column-oriented

ii) Graph

iii) Document -oriented

b) Explain CAP theorem and BASE properties. **[8]**

OR

Q6) a) Describe distributed database. Explain System architecture of distributed transaction. **[8]**

b) Explain following types of data with example **[9]**

i) Structured

ii) Semi-structured

iii) Unstructured

Q7) a) Write short note on **[9]**

i) Active database

ii) Deductive database

b) Explain how encoding and decoding of JSON object is done JAVA with example. **[9]**

OR

Q8) a) Write short note on **[9]**

i) Geometric data

ii) Geographic data

b) What is object relational database? What are its advantages and disadvantages? **[9]**

Total No. of Questions : 8]

SEAT No. :

PA-1441

[Total No. of Pages : 2

[5926]-57

T.E. (Computer / A.I.D.S. Engg)

DATABASE MANAGEMENT SYSTEMS

(2019 Pattern) (Semester - I) (310241)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Justify the impact of normalization on database? Explain 2nd normal form, 3rd normal form and BCNF with example. **[8]**

b) Elaborate the significance of codd's rule. Explain 12 rules proposed by codd's. **[9]**

OR

Q2) a) What is the impact of insert, update and delete anomaly on overall design of database? How is normalization used to remove these anomalies? **[9]**

b) Explain 3NF and BCNF and give its example. Also enlist their differences. **[8]**

Q3) a) Suppose a transaction T_i issues a read command on data item Q.How time-stamp based protocol decides whether to allow the operation to be executed or not using time-stamp based protocol of concurrency control. Explain in detail time stamp based protocol. **[9]**

b) Explain the concept of conflict serializability with suitable example. Since every conflict-serializable schedule is view serializable, why do we emphasize conflict serializability rather than view serializability? **[9]**

OR

Q4) a) State and explain the ACID properties. During its execution a transaction passes though several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain the situations when each state transition occurs. **[9]**

b) A transaction may be waiting for more time for an Exclusive (X) lock on an item, while a sequence of other transactions request and are granted as Shared (S) lock on the same item. What is this problem? How is it solved by two phase lock protocol? **[9]**

P.T.O.

Q5) a) Explain how NOSQL databases are different than relational databases? Describe in detail the key value store NOSQL data model with example. **[9]**

b) Explain BASE properties with its significance. How soft state of system is depending on Eventual consistency property? **[8]**

OR

Q6) a) List the different NOSQL data models. Explain document store NOSQL data model with example. **[9]**

b) State and explain the concept of CAP theorem and BASE properties with example. **[8]**

Q7) a) Write short note on : **[9]**

i) Active databases

ii) Deductive databases

b) What is the significance of XML databases? Explain with proper example when to use XML database. **[9]**

OR

Q8) a) Difference between relational databases and object relational databases with example **[9]**

b) Describe the significance of JSON data type and object. Discuss with syntax all JSON data types with suitable example. **[9]**

Total No. of Questions : 8]

SEAT No. :

P-268

[Total No. of Pages : 3

[6003]-346

T.E. (Computer/A.I.D.S.)

DATABASE MANAGEMENT SYSTEM

(2019 Pattern) (Semester - I) (End Sem.) (310241)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is the impact of insert, update & delete anomaly on overall design of database? How normalization is used to remove these anomalies? **[6]**

b) Explain different features of good relational database design. **[6]**

c) Explain following Codd's rules with suitable examples : **[6]**

i) Guaranteed Access Rule

ii) Comprehensive Data Sub-Language Rule

iii) High-Level Insert, Update, and Delete Rule

OR

Q2) a) Explain entity and referential integrity constraints used in SQL. **[6]**

b) Define 3NF. Explain with example, how to bring the relation in 3NF? **[6]**

c) Explain following Codd's rules with suitable examples : **[6]**

i) Physical Data Independence

ii) Integrity Independence

iii) Systematic Treatment of NULL Values

P.T.O.

Q3) a) State and explain the ACID Properties. During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain the situations when each state transition occurs. **[9]**

b) Check whether following schedule is view serializable or not. Justify your answer. (Note : T_1 & T_2 are transactions). Also explain the concept of view equivalent schedules and conflict equivalent schedule considering the example schedule given below : **[8]**

T_1	T_2
read (A)	
A := A – 50	
	read (A)
	temp :=A * 0.1
	A := A - temp
	write (A)
	read (B)
write (A)	
read (B)	
B := B + 50	
write (B)	
	B := B + temp
	write (B)

OR

Q4) a) Suppose a transaction T_i issues a read command on data item Q. How time-stamp based protocol decides whether to allow the operation to be executed or not using time-stamp based protocol of concurrency control. Explain the situations when each state transition occurs. **[9]**

b) Write a short note on : **[8]**

i) Log based recovery

ii) Shadow Paging

Q5) a) BASE Transactions ensures the properties like Basically Available, Soft State, Eventual Consistency. What is soft state of any system, how it is depend on Eventual consistency property? **[6]**

b) Enlist the different types of NOSQL databases and explain with suitable examples. **[8]**

c) What is structured and unstructured data. Explain with example. **[4]**

OR

Q6) a) Explain the CAP theorem referred during the development of any distributed application. **[6]**

b) Analyze the use of NOSQL databases in current social networking environment also explain need of NOSQL databases in social networking environment over RDBMS. **[6]**

c) Explain the difference between SQL and NOSQL database. **[6]**

Q7) a) Write a short note on emerging databases : **[9]**

i) Active and Deductive Databases

ii) Main Memory Databases

b) What is object relational database system. Explain Table inheritance with example. **[8]**

OR

Q8) a) Write a short note on complex data types : **[9]**

i) Semi-structured data

ii) Features of semi-structured data models

b) Describe spatial data like Geographic data and Geometric data. **[8]**

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Total No. of Questions : 8]

SEAT No. :

P-7537

[Total No. of Pages : 2

[6180]-45

T.E. (Computer Engg./Artificial Intelligence & Data Science)

DATABASE MANAGEMENT SYSTEM

(2019 Pattern) (Semester - I) (310241)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q. 1 or Q. 2, Q. 3 orQ. 4, Q. 5or Q. 6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is anomaly in relational model. Explain how normalization can be used to reduce the anomalies. **[9]**

b) Explain 2NF and 3NF and BCNF with example. **[9]**

OR

Q2) a) What are relational integrity constraints. Explain with example Domain constraints, Referential-Integrity and enterprise constraints. **[9]**

b) Elaborate the significance of codd's rule. Explain 12 rules proposed by codd's. **[9]**

Q3) a) Explain the concept of conflict serializability with suitable example. Since every conflict-serializable schedule is view serializable, why do we emphasize conflict serializability rather than view serializability? **[9]**

b) Explain the two-phase lock protocol for concurrency control. Also explain its two versions: strict two-phase lock protocol and rigorous two-phase lock protocol. **[8]**

OR

P.T.O.

Q4) a) What is R-timestamp(Q) and W-timestamp(Q) Explain the necessary condition used by time stamp ordering protocol to execute for a read / write operation. **[8]**

b) To ensure atomicity despite failures we use Recovery Methods Explain in detail following Log-Based Recovery methods with example. **[9]**

i) Deferred Database Modifications

ii) Immediate Database Modifications

Q5) a) Compare SQL and NOSQL Database. **[6]**

b) Explain BASE Properties of NOSQL Database. **[6]**

c) Explain Document Based and Key value data model of NOSQL Database. **[6]**

OR

Q6) a) Explain the CRUD operations used in MongoDB with example. **[6]**

b) State and Explain CAP Theorem. **[6]**

c) Explain Map Reduce with example. **[6]**

Q7) a) What are spatial data. Explain Geographic and Geometric data. **[8]**

b) What is the significance of XML databases? Explain with proper example when to use XML database. **[9]**

OR

Q8) a) Write a short note on complex data types : **[8]**

i) Semi-structured data

ii) Features of semi-structured data models

b) What is object relational database system. Explain Table inheritance with example. **[9]**

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Total No. of Questions : 8]

SEAT No. :

PB3777

[Total No. of Pages : 3

[6262]-35
T.E.(Computer Engineering/AIDS)
DATABASE MANAGEMENT SYSTEMS
(2019 Pattern) (Semester -I) (310241)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Answer Q.1or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is functional dependency? Explain its use in database design. **[9]**

Consider the following schema.

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Identify the functional dependencies and check whether the given schema is in 3NF or not. If not justify and convert the schema into 3NF.

b) Explain following Codd's rules with suitable examples: **[8]**

i) Guaranteed Access Rule
ii) Comprehensive Data Sub-Language Rule
iii) Integrity Independence
iv) Systematic Treatment of NULL Values.

OR

Q2) a) What is the impact of insert, update & delete anomaly on overall design of database? How normalization is used to remove these anomalies? **[8]**

b) What is decomposition? Consider the relation F (FN, PN, C, D) with the following Functional Dependencies: **[9]**

FD1: FN, PN ->C
FD2: C ->D
FD3: D -> F

If F is decomposed in to F1 (FN,PN,C) and F2 (C,D). check decomposition is lossless or lossy?

P.T.O.

Q3) a) What is recoverable schedule? Why is recoverability of schedule desirable?Are there any circumstance under Which it could be desirable to allow non recoverable schedular? Explain your answer. **[9]**

b) State and explain the ACID properties. During its execution a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain the situations when each state transition occours. **[9]**

OR

Q4) a) What is R-timestamp (Q) and W-timestamp(Q). Explain the necessary condition used by time stamp ordering protocol to execute for a read/write operation. [9]

b) What is conflict serializability? Check following schedule is conflict serializable or not? Also, explain the concept of conflict equivalent schedule. **[9]**

T1	T2	T3	T4
R(X)			
R(Z)			
	W(X)		
		R(Y)	
		W(Y)	
			W(X)
			W(Y)
			W(Z)

R(X) denotes read operation on data item X by transaction Ti.
W(X) denotes read operation on data item X by transaction Ti.

Q5) a) List the different NOSQL data models. Explain document store NOSQL data model with example. **[8]**

b) Draw and explain architecture of Distributed database system. State the reasons for building distributed database systems. **[9]**

OR

Q6) a) Explain Structured, Semi-structured and Unstructured data types with examples. **[9]**

b) Describe the following operations with MongoDB syntax: **[8]**

i) Map-Reduce ii) Aggregation pipeline

Q7) a) What is the significance of XML databases? Explain with proper example when to use XML database. **[9]**

b) Explain how encoding and decoding of JSON object is done JAVA with example. **[9]**

OR

Q8) a) Write a short note on complex data types: **[9]**

i) Semi-structured data

ii) Features of semi-structured data models

b) What is Deductive Database. Explain its features and state its advantanges over traditional database. **[9]**