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]**