

Total No. of Questions : 10]

SEAT No. :

P2990

[Total No. of Pages : 4

[5669]-582

**T.E. (Computer Engineering) (Semester - I)**  
**DATABASE MANAGEMENT SYSTEM**  
**(2015 Pattern)**

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, Q. 9 or Q. 10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

**Q1) a)** Assume we have the following application that models soccer teams, the games they play, and the players in each team. In the design, we want to capture the following : [5]

- We have a set of teams, each team has an ID (unique identifier), name, main stadium, and to which city this team belongs.
- Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, DoB, start year, and shirt number that he uses.
- Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team.
- For each match we need to keep track of the following:
  - The date on which the game is played
  - The final result of the match
  - The players participated in the match. For each player, how many goals he scored, whether or not he took yellow card, and whether or not he took red card.
  - During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place.
- Each match has exactly three referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. One referee is the main referee and the other two are assistant referee.

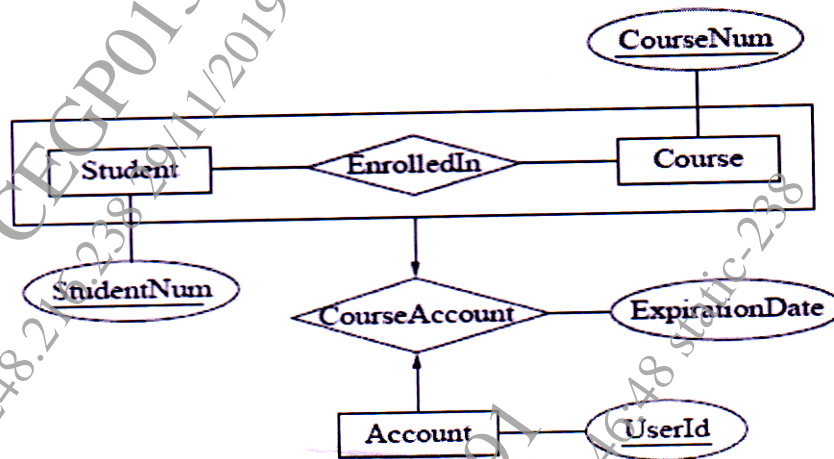
Design an ER diagram to capture the above requirements. State any assumptions you have that affects your design.

**P.T.O.**

- b) Draw the overall Database System Structure. Explain Storage manager, transaction manager and query processor in detail. [5]

OR

- Q2) a) Explain with suitable example what physical data independence is? Also Explain its importance. [5]
- b) Translate the following Entity-Relationship diagram to Relational Tables. [5]



- Q3) a) Explain the concepts of Referential Integrity Constraint and Entity Integrity Constraint with example. [5]
- b) Write SQL queries and PL/SQL block for following requirements on student\_fees\_detail table: [5]

student\_fees\_detail (name, total\_fees\_deposited, till\_date)

- i) Display the total fees deposited by students whose minimum 3 character name starts with aj.

Write PL/SQL Trigger to preserve the old values of student fees details after updating in table, Old values should be stored in Demo (stud\_fees) table.

OR

- Q4) a) What is and BCNF. Explain its differences with suitable example. [5]
- b) Write the PL/SQL procedure to calculate the factorial value of number.[5]

- Q5) a)** 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)	
$A := A - 50$	
write(A)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
read(B)	
$B := B + 50$	
write(B)	
	read(B)
	$B := B + temp$
	write(B)

- b) Explain the Two Phase lock Protocol and show how it ensures conflict serializability. Two Phase lock protocol does not ensure freedom from deadlock explain with necessary example. Also explain its two versions: strict two phase lock protocol and rigorous two phase lock protocol.[9]

OR

- Q6) 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. [8]

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

- Q7) a)** What is Data Replication and Data Fragmentation in Distributed Data Storage. Also explain the advantages of each type of distributed data storage. [9]

- b) Explain in details two important issues Speedup and Scale up in Parallel Databases. Also explain which factors work against efficient parallel operation and can diminish both speedup and scaleup. [8]

OR

- Q8)** a) Enlist the different Parallel Database Architectures? Explain with suitable diagram and mention its advantageous and disadvantageous. [8]
- b) Explain Two phase Commit (2PC) Protocol. Explain how 2PC protocol responds in different ways to various types of failures like site failure, coordinator failure and network partition. [9]
- Q9)** a) Explain the difference SQL Vs NoSQL [4]
- b) Enlist and explain any two NoSQL Database Models. [6]
- c) Explain following terms in brief : (any 2) [6]
- i) Structured Vs Unstructured Data
  - ii) HDFS
  - iii) Map Reduce

OR

- Q10)** a) Explain the CAP theorem referred during the development of any distributed application. [7]
- b) BASE Transactions ensures the properties like Basically Available, Soft State, and Eventual Consistency explain each property with its significance. How soft state of system is depending on Eventual consistency property? [9]

