



[4459] – 270

Seat No.	
-------------	--

**T.E. (Information Technology) (Semester – I) Examination, 2013
DATABASE MANAGEMENT SYSTEMS (DBMS)
(2008 Scheme)**

Time : 3 Hours

Max. Marks : 100

- Instructions :**
- 1) Answer **3** questions from Section I and **3** questions from Section II.
 - 2) Answers to the **two** Sections should be written in **separate** books.
 - 3) Neat diagrams must be drawn **wherever** necessary.
 - 4) Black figures to the **right** indicate **full** marks.
 - 5) Assume suitable data, if **necessary**.
 - 6) Solve Section I : Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6.
 - 7) Solve Section II : Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12.

SECTION – I

1. A) Explain components and overall structure of a DBMS. **8**
B) What is key ? Explain with example the distinctions among the terms primary key, candidate key and super key. **6**
C) Explain the roles and responsibilities of Database Administrator. **4**

OR

2. A) Following information is to be mentioned in library. **8**

Books(Accession_no, Title, Author, Price, Book_type, Publisher)

Borrow(Membership_no, Name, Address, Category, Max_no_Book_Issue, Accession_no).

The following constraints are to be observed :

- i) Each book has unique Accession_no.
- ii) A book may have more than one author.
- iii) The category of borrower determines the maximum number of books that may be issued to borrower.
- iv) There may be more than one copy of book.

Identify the entities, relationships and draw ER diagram which provides for issue and return of a book, find calculation and calming of an issued book.

P.T.O.



- B) Explain the difference between physical and logical data independence. **4**
- C) Explain the Codd's Rules. **6**
3. A) Consider the following relational schema. **8**
- $R = (A, B, C)$
- $S = (D, E, F)$
- Let the relation $r(R)$ and $s(S)$ be given. Give an expression in SQL that is equivalent to each of the following queries :
- i) $\pi_A(r)$
- ii) $\sigma_{B=23}(r)$
- iii) $r \times s$
- iv) $\pi_{A,F}(\sigma_{C=D}(r \times s))$.
- B) What is a view in SQL ? How is it created and stored ? List two major problem with modification of the database through view. **8**
- OR
4. A) What do you mean by join ? Explain different types of joins with example. **8**
- B) Consider the following relations : **8**
- Departments(Department_id, Department_name, manager_id, Location_id)
- Employees(Employee_id, Employee_name, mphone_number, Hire_Date, Job_Id, Salary, commission_PCT, manager_Id, Department_Id)
- i) Show the name, job, salary and commission of those employee who earn commission. Sort the data by the salary in descending order.
- ii) Show the department names, locations, names, job titles and salaries of employees who work in location 1800.
- iii) How many employees have a name that ends with an "n" ?
- iv) Show the names and locations for all departments and the number of employee working in each department. Make sure that departments without employees are included as well.
5. A) Specify Armstrong axioms. Use the definition of functional dependency and show that each of the Armstrong's axioms is sound. **8**
- B) What is normalization ? With suitable example explain 1NF, 2NF, 3NF. **8**

OR



6. A) Compute the closure of the following set F of FDs for relation schema 8
A=(A, B, C, D, E)
A→BC
CD→E
B→D
E→A
List the candidate keys for R.
- B) Define BCNF. Give BCNF decomposition algorithm. Compare 3NF and BCNF. 8

SECTION – II

7. A) Write short note on : 6
i) Query optimization
ii) Query processing.
- B) Construct a B+ tree for the following set of key values : 8
(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)
Assume order of tree is four.
- C) Differentiate between static and dynamic hashing. 4

OR

8. A) Describe the structure of B+ tree. How does it differ from B tree ? How to implement dynamic multilevel indices ? 8
- B) Explain the following : 10
i) Primary Index
ii) Ordered Index
iii) Dense Index
iv) Sparse Index
v) Multilevel Index.
9. A) Describe ACID properties for transaction along with implementation of consistency. 8
- B) Explain two-phase locking protocol with suitable example. 8

OR



10. A) Define serializability. Give test for conflict serializability. Check whether following schedule is conflict serializable.

8

T1	T2
read(A)	
write(A)	
	read(A)
	write(A)
read(B)	
write(B)	
	read(B)
	write(B)

- B) What is meant by deadlock ? How to prevent it ? How to recover if deadlock takes place ?

8

11. A) Explain the following terms related to distributed database system.

8

- i) Homogeneous and heterogeneous distributed database
- ii) Data replication
- iii) Data fragmentation
- iv) Transparency.

- B) Explain different pointer sizzling techniques.

8

OR

12. A) Write a short note on :

12

- i) Data warehouse
- ii) Data mining
- iii) Object oriented database.

- B) Explain centralized and client server database architectures.

4