WEST BENGAL UNIVERSITY OF TECHNOLOGY

EE-604B

DATA BASE MANAGEMENT SYSTEM

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable. All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer *all* questions. $10 \times 1 = 10$

(i) Which is not a component of a relation database?
(A) Entity (B) Attribute (C) Table (D) Hierarchy

(ii) _____ normal forms are associated with multi-valued dependency.
(A) First (B) Second (C) Third (D) Fourth

(iii) Serializability of concurrent transaction is ensured by
(A) locking (B) time stamping
(C) both (A) and (B) (D) none of these

(iv) Cardinality ratio means
(A) number of attributes associated with an entity
(B) number of entity related with other entity via a relationship
(C) both (A) and (B)
(D) none of these

(v) Data integrity refers to
(A) non-duplication of data (B) accuracy of data
(C) security of data (D) centralized data

(vi) Check-pointing is associated with
(A) log based recovery (B) non-log based recovery
(C) both (A) and (B) (D) none of these

(vii) A _____ is set of attributes in a relation that serves as primary key of another relation in the same.
(A) composite key (B) foreign key
(C) identifier (D) primary key

(viii) 2PL protocol suffers from
(A) deadlock (B) cascading rollback
(C) both (A) and (B) (D) none of these

(ix) Dirty read refers to the state in which data has been updated by a transaction and
(A) the transaction has been committed
(B) the transaction has been aborted
(C) the transaction has been restarted
(D) the transaction has not yet been committed

(x) _____ is a structure that provides faster access to the rows of a table based on the values of one or more columns.
(A) Views (B) Index
(C) Sequence (D) None of these

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. Describe the concept of specialization and generalization in context of E-R data model. 5

3. Discuss the ACID properties of transactions. 5

4. Explain Natural join, Left outer join, Right outer join and Full outer join with the help of examples. 5

5. Discuss five main advantages of database management systems over file management system. 5

6. Consider the following relations for a database that keeps track of business trips of salesperson in a sales office: 2.5+2.5
SALESPERSON (SSN, Name, Start_Year, Dept_No)
TRIP (SSN, From_City, To_City, Departure_Date, Return_Date, Trip ID)
EXPENSE (Trip ID, Account#,. Amount)
Specify the following queries in either relational algebra or in SQL:
(i) Give the details (all attributes of TRIP relation) for trip that exceeded Rs. 2,000 in expenses.
(ii) Print SSN of salesman who took trips to 'Andaman'.

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) What is physical and logical data independence? Explain different levels of data independence. 5
(b) Why is it beneficial to store data in a database, than a text file in computers? 5
(c) Draw the E-R diagram for a Company Personal Database. 5
(i) Company has a set of Departments
(ii) Each department has set of Employees and Projects.
(iii) An employee may have some dependents.

8. (a) What do you mean by transactions? Explain the transaction states. 5+5+5
(b) Consider the schedule shown below:
(i) Show that it is not conflict Serializable.
(ii) Is it view Serializable? Explain your answer.

T1	T2	T3
R(X)		
		R(X)
W(X)		
	R(X)	
		W(X)

9. Consider the following employee database, primary keys are underlined. 2+3+3+3+4

Employee (employee-name, street, city)
Works (employee-name, company-name, salary)
Company (company-name, city)
Managers (employee-name, manager-name)
Write SQL's for the queries for the given below:

(i) Find the names of all employees who work for XYZ.

(ii) Find all employees in the database who live in the same cities as the companies for which they work.

(iii) Find all employees in the database who live in the same cities and on the same streets as do their managers.

(iv) Find all employees who earn more than the average salary of all employees of their company.

(v) Find the company that has the smallest payroll.

10. (a) Consider the following two sets of functional dependencies 5

$X = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ and $Y = \{A \rightarrow CD, E \rightarrow AH\}$.

Check whether or not they are equivalent.

(b) What is a trigger? 3

(c) Write the fundamental operations in Relational Algebra. 3

(d) Discuss about difficult joined operation. 4

11. Write short notes on any *three* of the following: 3×5

(a) Join dependency and 5NF

(b) Hashing

(c) Database models

(d) File indexing

(e) Transitive Dependency.