Database Management System Question Banks

Q. No	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	**List** the advantages of DBMS?	Knowledge	1
2	**List** the database Applications?	Knowledge	2
3	**Define** instances and schemas of database?	Knowledge	2
4	**Discuss** Data Independence?	Understand	2
5	**Explain** database Access for applications Programs	Understand	2
6	**Define** (i) Database (ii) DBMS	Knowledge	2
7	**Explain** about Database storage structure?	Understand	2
8	**Discuss** Transaction management?	Understand	2
9	**Explain** the Query Processor?	Understand	2
10	**Define** (i) Entity (ii) Attribute	Knowledge	3
11	**Define** Relationship and Relationship set?	Knowledge	3
12	**Discuss** about Data Definition language?	Understand	9
13	**Discuss** about Data Manipulation language?	Understand	9
14	**Explain** about querying relational data?	Understand	9
15	**Explain** the History of Data base Systems?	Understand	2
16	**Discuss** how can you change the data in the table?	Understand	9
17	**List** various types of attributes?	Knowledge	3
18	**Discuss** How can you alter and destroy tables?	Understand	9
19	**Explain** data model and list the types of data model used?	Understand	2
20	**List** the disadvantages of file processing system?	Knowledge	2
21	**Give** the levels of data abstraction?	Understand	2
22	**Define** instance and schema?	Knowledge	3

23	**Define** the terms i) Entity type ii) Entity set	Knowledge	3
24	**Define** weak and strong entity sets?	Knowledge	3
25	**Explain** about stored and derived attributes?	Understand	3
	UNIT – II		
1	**Define** relational database query?	Knowledge	8
2	**State** about SELECT operation in Relational algebra?	Knowledge	8
3	**State** about PROJECT operation in Relational algebra?	Knowledge	8
4	**Define** Aggregate Functions?	Knowledge	10
5	**Discuss** the use of rename operation?	Understand	8
6	**Illustrate** division operation?	Apply	8
7	**Discuss** the basic form of SQL query?	Understand	9
8	**Define** Null Values.	Knowledge	10
9	**Define** tuple variable with its syntax?	Knowledge	8
10	**Define** Dynamic SQL?	Knowledge	10
11	**Define** Assertions?	Knowledge	6
12	**Discuss** about trigger?	Understand	10
13	**Demonstrate** how to add a NOT NULL column to a table?	Apply	10
14	**List** the aggregate functions supported by SQL?	Knowledge	10
15	**List** the table modification commands in SQL?	Knowledge	10
16	**What** is domain integrity? Give example.	Understand	10
17	**List** the set operations of SQL?	Knowledge	10
18	**What** is the use of group by clause?	Understand	10
19	**Discuss** about the operators SELECT, PROJECT, UNION?	Knowledge	10
20	**Discuss** about the operators renaming, joins, division?	Knowledge	10
	UNIT – III		
1	**Define** redundancy?	Knowledge	5
2	**Define** functional dependency? Why are some functional dependencies trivial?	Knowledge	5
3	**Discuss** normalization?	Understand	5
4	**Illustrate** functional dependency with example?	Apply	5
5	**Illustrate** fully functional dependency with example?	Apply	5
6	**Demonstrate** transitive dependency? Give an example?	Apply	5
7	**Discuss** Domain-Key Normal Form?	Understand	5
8	**Define** Armstrong axioms for FD's?	Knowledge	5
9	**Define** First Normal Form?	Knowledge	5
10	**Define** Second Normal Form?	Knowledge	5
11	**Define** Third Normal Form?	Knowledge	5
12	**Define** Fourth Normal Form?	Knowledge	5
13	**List** out the Problems related to decompositions?	Knowledge	5
14	**Explain** about Loss less-join dependency?	Understand	5
15	**Explain** about BCNF?	Understand	5
16	**Explain** about multi-valued dependencies?	Understand	5
17	**Define** join dependency and fifth normal form?	Knowledge	5
18	**Explain** the concept scheme refinement in database design?	Understand	5
19	**Define** dependency preserving decomposition?	Knowledge	5
20	**Explain** about inclusion dependency?	Understand	5
	UNIT – IV		
1	**Define** a Transaction? List the properties of transaction	Knowledge	7
2	**Discuss** different phases of transaction?	Understand	7
3	**Discuss** recoverable schedules?	Understand	7
4	**Discuss** cascade less schedules?	Understand	7
5	**Define** Two Phase Commit protocol?	Knowledge	7
6	**Demonstrate** the implementation of Isolation?	Apply	7
7	**Discuss** the Procedure to test Serializability?	Understand	7
8	**Explain** about different types of locks?	Understand	7
9	**Discuss** about Failure Classification?	Understand	7
10	**Define** a checkpoint?	Knowledge	7
11	**Discuss** the failures that can occur with loss of Non-volatile storage?	Understand	7
12	**Demonstrate** Conflict Serializability?	Apply	7
13	**Discuss** View Serializability?	Understand	7
14	**Explain** about transition states?	Understand	7
15	**Explain** about acid properties?	Understand	7

16	**Explain** about locking protocols?	Understand	7
17	**Define** timestamp based protocol?	Understand	7
18	**Explain** about multiple granularity?	Understand	7
19	**Explain** about storage structure?	Understand	7
20	**Explain** about remote backup systems?	Understand	7
	UNIT – V		
1	**Discuss** about data on External storage?	Understand	2
2	**Explain** Clustered Indexes?	Understand	11
3	**Discuss** the Primary and Secondary indexes?	Understand	11
4	**Define** Tree Indexing?	Knowledge	11
5	**Explain** Hash based Indexing?	Understand	11
6	**Discuss** the intuition for Tree Indexes?	Understand	11
7	**Define** Indexed Sequential Access Method?	Knowledge	11
8	**Discuss** about Overflow pages and Locking considerations of ISAM?	Understand	11
9	**Discuss** the Cost model of Heap files?	Understand	11
10	**Discuss** the Cost model of Sorted files?	Understand	11
11	**Discuss** the Cost model of Clustered files?	Understand	11
12	**Explain** about several ordered indexing?	Understand	11
13	**Explain** about B+ tree index file?	Understand	11
14	**Explain** about static hashing?	Understand	11
15	**Explain** about organization of records in files?	Understand	11
16	**Discuss** the impact of Workload on Indexes?	Knowledge	11
17	**Explain** about RAID	Understand	2
18	**Define** extendable hashing?	Knowledge	11
19	**Define** linear hashing?	Knowledge	11
20	**Differentiate** extendable vs linear hashing?	Knowledge	11

PART – B (Long Answer Questions)

Q. No	Questions	Blooms Taxonomy Level	Course Outcome
	UNIT – I		
1	**Compare and Contrast** file Systems with database systems?	Apply	1
2	**Define** Data Abstraction and discuss levels of Abstraction?	Knowledge	2
3	**Discuss** about different types of Data models?	Understand	2
4	**Describe** the Structure of DBMS?	Understand	2
5	**Discuss** additional features of the ER-Models.	Understand	3
6	**Discuss** about the Concept Design with the ER Model?	Understand	4
7	**Write** about views and updates on views?	Knowledge	10
8	**Explain** different types of database users and write the functions of DBA?	Understand	2
9	**Explain** about different types of integrity constraints?	Understand	6
10	**Discuss** about the logical database Design?	Understand	4
11	**Distinguish** strong entity set with weak entity set? Draw an ER diagram to illustrate weak entity set?	Apply	3
12	**Differentiate** relation schema and relational instance? Define the terms arity and degree of s relation? What are domain constraints?	Understand	2
13	**Illustrate** outer joins with example?	Apply	10
14	**Describe** logical connectives of SQL?	Understand	10
15	**Discuss** about active databases?	Understand	10
	UNIT – II		
1	**Illustrate** different set operations in Relational algebra with an example?	Apply	8
2	**Define** Join? Explain different types of joins?	Knowledge	10
3	**Discuss** about Domain Relational calculus in detail?	Understand	8
4	**Define** trigger and explain its three parts? Differentiate row level and statement level triggers?	Knowledge	10
5	**Illustrate** Group by and Having clauses with examples?	Apply	10
6	**Discuss** about Complex integrity constraints in SQL?	Understand	6
7	**Discuss** different types of aggregate operators with examples in SQL?	Understand	10
8	a. **Define** a nested query? b. **Write** a nested query to find the names of sailors who have reserved both a	Knowledge	

	red and green boat? c. **Write** a nested query to find the names of sailors who have reserved all boats?		10
9	a. **Discuss** correlated nested queries? b. **Write** a query to find the names of sailors who have reserved a red boat? c. **Write** a query to find the names of sailors who have not reserved a red boat?	Understand	10
10	a. **Explain** Relational calculus? b. **Write** a TRC query to find the names of sailors who have reserved boat 103? c. **Write** a DRC query to find the names of sailors who have reserved boat 103?	Understand	10
	UNIT – III		
1	**Illustrate** redundancy and the problems that it can cause?	Apply	5
2	**Define** decomposition and how does it address redundancy? Discuss the problem s that may be caused by the use of decompositions?	Knowledge	5
3	**Define** functional dependencies.How are primary keys related to FD's?	Knowledge	5
4	**Define** normalization? Explain 1NF, 2NF, 3NF Normal forms?	Knowledge	5
5	**Compare and contrast** BCNF with 3NF?	Apply	5
6	**Describe** properties of decompositions?	Understand	5
7	**Explain** about Schema refinement in Database design?	Understand	5
8	**Illustrate** Multivalued dependencies and Fourth normal form with example?	Apply	5
9	**Discuss** about Join dependencies and Fifth normal form?	Understand	5
10	**Illustrate** Inclusion dependencies with example?	Apply	5
	UNIT – IV		
1	**Explain** ACID properties and Illustrate them through examples?	Understand	7
2	**Discuss** How do you implement Atomicity and Durability?	Understand	7
3	**Illustrate** Concurrent execution of transaction with examples?	Apply	7
4	**Discuss** Serializability in detail?	Understand	7
5	**Discuss** two phase locking protocol and strict two phase locking protocols?	Understand	7
6	**Describe** Timestamp based locking protocols?	Understand	7
7	**Describe** Validation-based locking protocols?	Understand	7
8	**Discuss** in detail Multiple Granularity?	Understand	7
9	**Explain** in detail Storage structure?	Understand	7
10	**Discuss** Deferred database modification and Immediate database modification?	Understand	7
11	**Discuss** how do you recover from Concurrent transactions?	Understand	7
12	**Explain** Buffer Management?	Understand	7
13	**Explain** different types of Advanced Recovery Techniques?	Understand	7
14	**Write** in detail about Remote Backup systems?	Apply	7
	UNIT – V		
1	**Write** in detail about Hash based Indexing and Tree based Indexing?	Apply	11
2	**Compare** I/O costs for all File Organizations?	Understand	11
3	**Explain** in detail about ISAM?	Understand	11
4	**Explain** B+ trees? Discuss about this Dynamic Index Structure?	Understand	11
5	**Demonstrate** searching a given element in B+ trees? Explain with example?	Understand	11
6	**Illustrate** insertion and deletion of an element in B+ trees with example?	Apply	11
7	**Write** in detail about Static Hashing?	Apply	11
8	**Explain** in detail about Extendible Hashing?	Understand	11
9	**Explain** in detail about Linear Hashing?	Understand	11
10	**Compare and Contrast** Extendible Hashing with Linear Hashing?	Apply	11

PART – C (Problem Solving and Critical Thinking Questions)

<table>
<tr><th>Q. No</th><th>Questions</th><th>Blooms Taxonomy Level</th><th>Course Outcome</th></tr>
<tr><td colspan="4">UNIT – I</td></tr>
<tr><td>1</td><td>Let E1 and E2 be two entities in an E/R diagram with simple single-valued attributes. R1 and R2 are two relationships between E1 and E2, where R1 is one-to-many and R2 is many-to-many. R1 and R2 do not have any attributes of their own. Calculate the minimum number of tables required to represent this situation in the relational model?</td><td>Apply</td><td>3</td></tr>
<tr><td>2</td><td>Analyze and find whether View exists if the table is dropped from the database?</td><td>Analyze</td><td>10</td></tr>
<tr><td>3</td><td>We can convert any weak entity set to strong entity set by simply adding appropriate attributes. Analyze why, then, do we have weak entity sets?</td><td>Analyze</td><td>3</td></tr>
<tr><td colspan="4">UNIT – II</td></tr>
<tr><td>1</td><td>Consider the following relational schema
Employee (empno,name,office,age)
Books(isbn,title,authors,publisher)
Loan(empno, isbn,date)
Write the following queries in relational algebra.
a. Find the names of employees who have borrowed a book Published by McGraw-Hill?
b. Find the names of employees who have borrowed all books Published by McGraw-Hill?
c. Find the names of employees who have borrowed more than five different books published by McGraw-Hill?
d. For each publisher, find the names of employees who have borrowed?</td><td>Apply</td><td>10</td></tr>
<tr><td>2</td><td>Given the Students relation as shown below
<table><tr><th>StudentID</th><th>StudentName</th><th>StudentEmail</th><th>StudentAge</th><th>CPI</th></tr><tr><td>2345</td><td>Shankar</td><td>shankar@math</td><td>X</td><td>9.4</td></tr><tr><td>1287</td><td>Swati</td><td>swati@ee</td><td>19</td><td>9.5</td></tr><tr><td>7853</td><td>Shankar</td><td>shankar@cse</td><td>19</td><td>9.4</td></tr><tr><td>9876</td><td>Swati</td><td>swati@mech</td><td>18</td><td>9.3</td></tr><tr><td>8765</td><td>Ganesh</td><td>ganesh@civil</td><td>19</td><td>8.7</td></tr></table>
For (Student Name, Student Age) to be the key for this instance, analyze and find value of X not be equal to?</td><td>Apply</td><td>10</td></tr>
<tr><td>3</td><td>Given the relations
employee(name,salary,deptno)
department (deptno, deptname, address)
Solve which query cannot be expressed using the basic relational algebra Operations(U, -,x , ,p)?</td><td>Apply</td><td>10</td></tr>
<tr><td>4</td><td>Write SQL Query to find second highest salary of Employee from Employee table?</td><td>Apply</td><td>10</td></tr>
<tr><td colspan="4">UNIT – III</td></tr>
<tr><td>1</td><td>Consider a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–> D, E–>C, D–>A}. Write the candidate keys of R?</td><td>Apply</td><td>5</td></tr>
<tr><td>2</td><td>Consider the following relational schemes for a library database:
Book (Title, Author, Catalog_no, Publisher, Year, Price)
Collection (Title, Author, Catalog_no)
the following are functional dependencies:
a. Title Author --> Catalog_no
b. Catalog_no --> Title Author Publisher Year
c. Publisher Title Year --> Price
d. Assume {Author, Title} is the key for both schemes. Apply the appropriate normal form for Book and Cancellation?</td><td></td><td></td></tr>
<tr><td>3</td><td>Consider a schema R (A, B, C, D) and functional dependencies A -> B and C ->D. Solve and find whether the decomposition of R into R1 (A, B) and R2(C, D) belongs to which one or both (dependency preserving and loss less join)?</td><td>Apply</td><td>5</td></tr>
<tr><td>4</td><td>Show that: if α → β and α → γ then α → βγ</td><td>Apply</td><td>5</td></tr>
<tr><td colspan="4">UNIT - IV</td></tr>
<tr><td>3</td><td>Consider the following transactions with data items P and Q initialized to zero:
T1: read(P);
read(Q);
If P=0 then Q:=Q+1;</td><td>Apply</td><td>7</td></tr>
</table>

	write(Q);
	T2: read(Q);
	read(P);
	If Q=0 then P:=P+1;
	write(P);
	Solve and find any non-serial interleaving of T1 and T2 for concurrent execution leads to a serializable schedule or non serializable schedule. Explain?		

2	**Analyze** which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock? Explain the following: a. 2-phase locking b. Time-stamp ordering	Apply	7
3	Consider the transactions T1, T2, and T3 and the schedules S1 and S2 given below. T1: r1(X);r1(Z);w1(X);w1(Z) T2: r2(Y);r2(Z);w2(Z) T3: r3(Y);r3(X);w3(Y) S1: r1(X);r3(Y);r3(X);r2(Y);r2(Z); w3(Y);w2(Z);r1(Z);w1(X);w1(Z) S2: r1(X); r3(Y); r2(Y); r3(X); r1(Z); r2(Z); w3(Y); w1(X); w2(Z); w1(Z) **Analyze** which one of the schedules is conflict-serializable?		
4	Suppose that there is a database system that never fails. **Analyze** whether a recovery manager required for this system?	Apply	7
	UNIT – V		
1	Consider a B+-tree in which the maximum number of keys in a node is 5. **Calculate** the minimum number of keys in any non-root node?	Apply	11
2	In the index allocation scheme of blocks to a file, **Calculate** on what maximum possible size of the file depends?	Apply	11
3	A clustering index is defined on the fields of which type? **Analyze** them.	Apply	11
4	**Calculate** the minimum space utilization for a B+ tree index?	Apply	11
5	Consider the B+ tree index of order d = 2 shown in Figure  a. Show the tree that would result from inserting a data entry with key 9 into this tree. b. Show the B+ tree that would result from deleting the data entry with key 8 from the original tree, assuming that the left sibling is checked for possible redistribution	Apply	11