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## DEPARTMENT

PART B (MODULE III)				1*	2*	3*	4*
		<b>15 Marks Questions</b> <i>Each question can have maximum four sub division</i> <b>(Prepare maximum Questions possible, covering all areas of the modules assigned )</b>	Marks	Course Outcome	Knowledge Level	Theory(T)/ Problem(P)/ Design(D)	Difficulty Level (S/A/D/T)
1	(a)	Consider an EMPLOYEE file with 10000 records where each record is of size 80 bytes. The file is sorted on employee number (15 bytes long), which is the primary key. Assuming un-spanned organization, block size of 512 bytes and block pointer size of 5 bytes, compute the number of block accesses needed for retrieving an employee record based on employee number if (i) No index is used (ii) Multi-level primary index is used	( )				

2		<p>Consider a file with 2,00,000 records stored in a disk with fixed length blocks of size 256 bytes. Each record is of size 50 bytes. The primary key is 4 bytes and block pointer is 6 bytes. Compute the following, assuming that multi-level primary index is used as access path: (10)</p> <ul style="list-style-type: none"> <li>(i) Blocking factor for data records</li> <li>(ii) Blocking factor for index records</li> <li>(iii) Number of data blocks</li> <li>(iv) Number of First level index blocks</li> <li>(v) Number of levels of multi level index</li> </ul>	( )				
3		<p>There are 12000 records in a data file. Each record in the file is of 75 bytes. Compute the number of block accesses if (i) Single level secondary index is available on a field of size 15 bytes. (ii) Multilevel index is available on the same field. (7)</p> <p>Assume that the block size is 394 bytes, that un-spanned organization is used and that block and record pointers are 5 and 7 bytes, respectively.</p>	( )				
4		<p>Suppose that we have an ordered file with 400,000 records stored on a disk with block size 4,096 bytes. File records are of fixed size and are unspanned, with record length 200 bytes. How many blocks are needed for the file? Approximately, how many block accesses are required for a binary search in this file? On an average, how many block accesses are required for a linear search, if the file is nonordered</p> <p>Based on question 15.a, give an example to illustrate that indexing can improve the search time.</p>					
5		<p>Consider a file with 450000 records . Each record size is 125 bytes and block is 1000 bytes. The primary key of the file is 10 bytes and record pointer size is 6 bytes.</p> <p>1). Calculate number of index block required in case of primary indexing</p>					

		2) Calculate number of index blocks required in case of multilevel indexing					
6		<p>Suppose that we have an ordered file with <math>r=30000</math> records stored on a disk with block size <math>B=1024</math> bytes. File records are of fixed length and are un-spanned with record length <math>R=100</math> bytes. Assume that the file is ordered on the attribute <math>V</math> of length 9 bytes and the block pointer length <math>P=6</math> bytes. Compute the number of block access for the file</p> <p>i. Binary search (no index)</p> <p>ii. Search a record using Primary index</p> <p>Discuss the major issues associated with primary indexing</p>					
7		<p>There are 12000 records in a data file. Each record in the file is of 75 bytes.</p> <p>Compute the number of block accesses if (i) Single level secondary index is available on a field of size 15 bytes. (ii) Multilevel index is available on the same field.</p> <p>Assume that the block size is 394 bytes, that un-spanned organization is used and that block and record pointers are 5 and 7 bytes, respectively</p>					
8		Define the following: (i) physical record (ii) logical record (iii) blocking factor					
9		With the help of an example, illustrate the use of SQL TRIGGER	()				
10		List the basic data types available for defining attributes in SQL	()				
11		With suitable example, list aggregate functions in sql	()				
12		What is the importance of views in sql? Explain with suitable example	()				

13		Differentiate DDL and DML with suitable example.	()				
14		Demonstrate the working of GROUP BY clause in SQL	()				
15		<p>Consider the following schema and write SQL queries to find:</p> <p>STUDENT (rollNo, name, degree, year, sex, deptNo, advisor)</p> <p>DEPARTMENT (deptId, name, hod, phone)</p> <p>PROFESSOR (empId, name, sex, startYear, deptNo, phone)</p> <p>COURSE (courseId, cname, credits, deptNo)</p> <p>ENROLLMENT (rollNo, courseId, sem, year, grade)</p> <p>TEACHING (empId, courseId, sem, year, classRoom)</p> <p>PREREQ(preCourseId, courseId)</p> <p>i. Get the employee Id, name and phone number of professors in the CS dept (deptNo= 3) who have joined after 1999.</p> <p>ii. Get the rollNo, name of students in the CSE dept (deptNo= 3) along with their advisor's name and phone number.</p> <p>iii. Get the rollNo, name of students who have a lady professor as their advisor.</p> <p>iv. Get the roll number and name of students whose gender is same as their advisor's.</p>	()				
16		How view is different from a table in SQL? Give the syntax of view declaration and	()				

		illustrate the use with an example					
17		<p>Consider the schema given below.</p> <p>person (driver-id, name, address)</p> <p>car (reg-no, model, year, driver-id)</p> <p>accident (report-number, date, location)</p> <p>participated (driver-id, reg-no, report-number, damage-amount)</p> <p>Write SQL queries for the following</p> <p>a. Find the name of driver, who is drives the car with reg-no='AABB2000'. Find the total number of people who were involved in car accidents in 01-01-1989.</p> <p>c. Find the number of accidents in which the cars belonging to “John Smith” were involved.</p> <p>d. Update the damage amount for the car with reg-no “AABB2000”in the accident with report number “AR2197” to \$3000</p>	()				
18		<p>Consider the following relations for bank database (Primary keys are underlined):</p> <p>Customer (customer-name, customer-street, customer-city)</p> <p>Branch (branch-name, branch-city, assets)</p> <p>Account (account-number, branch-name, balance)</p> <p>Depositor (customer-name, account-number)</p> <p>Loan (loan-number, branch-name, amount)</p> <p>Answer the following in SQL:</p>					

		<p>i) Create tables with primary keys and foreign keys</p> <p>ii) Create an assertion for the sum of all loan amounts for each branch must be less than the sum of all account balances at the branch</p>					
19		<p>In the following tables ADVISOR and TAUGHTBY are foreign keys referring to the table PROFESSOR. ROLLNO and COURSEID in ENROLLMENT refer to tables with primary keys of the same name.</p> <p>STUDENT(ROLLNO, NAME, AGE, GENDER, ADDRESS, ADVISOR)</p> <p>COURSE(COURSEID, CNAME, TAUGHTBY, CREDITS)</p> <p>PROFESSOR(PROFID, PNAME, PHONE)</p> <p>ENROLLMENT(ROLLNO, COURSEID, GRADE)</p> <p>Write SQL expressions for the following queries:</p> <p>(i) Names of courses taught by 'Prof. Raju'.</p> <p>(ii) Names of students who have not enrolled for any course taught by 'Prof. Ganapathy'.</p> <p>(iii) For each course, name of the course and number of students enrolled for the course.</p>					
20		<p>Consider the following relations:</p> <p>FACULTY(FNO, NAME, GENDER, AGE, SALARY, DNUM)</p> <p>DEPARTMENT(DNO, DNAME, DPHONE)</p> <p>COURSE(CNO, CNAME, CREDITS, ODNO)</p> <p>TEACHING(FNO, CNO, SEMESTER)</p>					

		<p>DNUM is a foreign key that identifies the department to which a faculty belongs. ODNO is a foreign key identifying the department that offers a course.</p> <p>Write SQL expressions for the following queries:</p> <ul style="list-style-type: none"> <li>a) Course numbers and names of 3-credit courses offered by 'CS' department</li> <li>b) Names of faculty members teaching maximum 3 courses</li> <li>c) Names of departments along with number of courses offered by each of them, in the increasing order of number of courses; exclude departments which do not offer any course</li> </ul>					
21		<p>Consider two tables STUDENT( ENROLLMENT(ROLLNO,COURSENAME ENROLLMENT is a foreign key referring to every time a STUDENT tuple is deleted, all the ENROLLMENT tuples referring to the deleted STUDENT tuple are also deleted. Write SQL statements to specify this foreign key requirement</p>					
		<p>Consider a scenario where movie can have many artists. Assuming suitable attributes be represented using relations with foreign keys. (A relational schema showing primary and foreign keys is sufficient. Minimal number of attributes is required)</p>					

22		Compare primary indexing, secondary indexing and clustered indexing with suitable diagram.	()				
23		Define the structure of B+ tree	()				
24		What is multi-level index? When do you prefer multilevel index over single level index?	()				
25		What is a correlated subquery in SQL? Give example	()				
26		Write SQL DDL commands to construct the 'Catalog' table in the following relations Suppliers(sid: integer, sname: string, address: string) Parts(pid: integer, pname: string, color: string) Catalog(sid: integer, pid: integer, cost: real) Include the primary key and referential integrity constraints in the table.	()				
27		How is DML different from DDL? Write a sample statement in DML and one in DDL	()				
28		Consider the query SELECT NAME, AGE FROM STUDENT WHERE GENDER = 'Male' on the table STUDENT(ROLLNO, NAME, AGE, GENDER, ADDRESS). Give a relational algebra expression corresponding to the query. Is result produced by the query and your expression always the same? Why?					
29		Illustrate use of assertions with an example	()				
30		Given two tables STUDENT( ENROLLMENT(ROLLNO,COURSENAME refers to STUDENT, what does the following SQL statement return?	()				



		SELECT COURSENAME FROM ENROLLMENT WHERE ROLLNO = ALL (SELECT ROLLNO FROM STUDENT)					
31		Define super key and minimal super key and illustrate using good examples	()				
32		Consider the following relations:  FACULTY(FNO, NAME, GENDER, AGE, SALARY, DNUM) DEPARTMENT(DNO, DNAME, DPHONE) COURSE(CNO, CNAME, CREDITS, ODNO) TEACHING(FNO, CNO, SEMESTER)  DNUM is a foreign key that identifies the department to which a faculty belongs. ODNO is a foreign key identifying the department that offers a course. Write SQL expressions for the following queries:  (a) Names and department names of faculty members. (b) Names of faculty members not offering any course. (c) Names of departments offering more than three courses, in alphabetic order.	()				
33		Can you explain the concept of extendible hashing, and how it can be used to efficiently access data in a large database?	()				
34		What is the structure of B-trees and B+-trees, and how do these data structures optimize database performance?	()				
35		Can you explain the concept of extendible hashing, and how it can be used to efficiently access data in a large database?	()				

36		How do you perform indexing on multiple keys in SQL, and what are the advantages and limitations of using grid files for this purpose?	()				
37		How do aggregation and grouping functions work in SQL, and what are some common use cases for these functions?	()				
38		In what situations would you need to use a nested SQL query, and how do you write a non-correlated query?	()				
39		Can you provide an example of a correlated SQL query, and explain why it is useful in certain contexts?	()				
40		How do aggregation and grouping functions work in SQL, and what are some common use cases for these functions?	()				
			()				