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B.M.S. College of Engineering, Bengaluru-560019

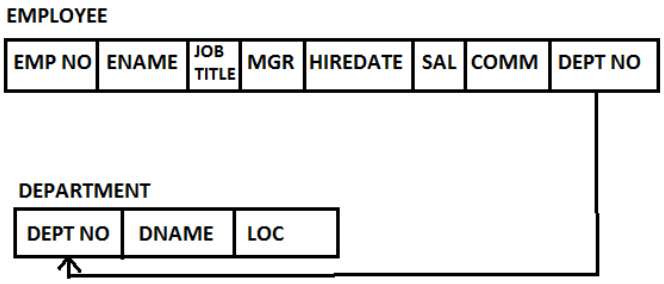
Autonomous Institute Affiliated to VTU

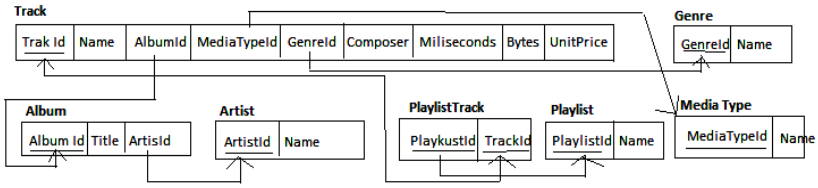
September / October 2024 Supplementary Examinations

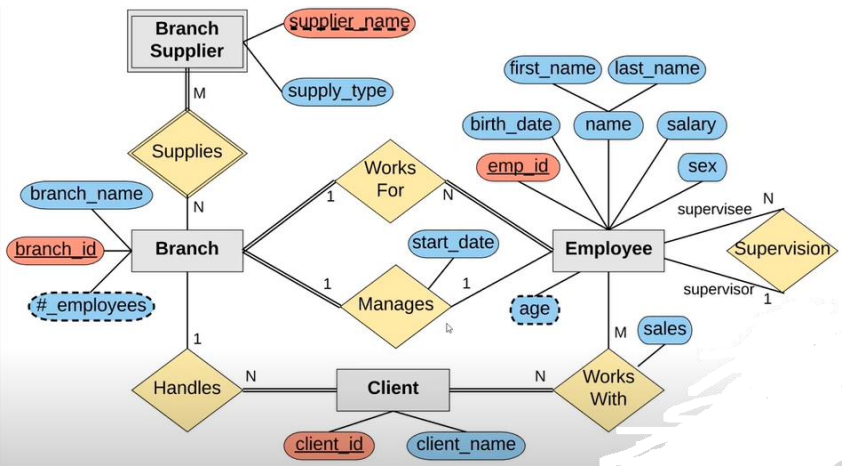
Programme: B.E. **Semester: III**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 22CS3PCDBM **Max Marks: 100**
Course: Database Management Systems

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	List and explain the advantages of using database approach.	1	1	5
	b)	Analyze the below given SQL query and rewrite 1st query using nested/sub queries and 2nd query using correlated query. 1. Query to list down the movie titles directed by Manirathnam: SELECT movie_title FROM movie_director m, person p WHERE m.pid = p.pid and p.name='Manirathnam'; 2. Find the names of publishers who have published CSE books: SELECT pub_name FROM publisher p, titles t WHERE p.p_id=t.pid AND t.type='CSE';	2	2	5
	c)	Write the SQL query for the below given database design:  A. List the details of the employees in ascending order of the department number and descending of jobs. B. List the employee name who joined on 1-MAY-21,3-DEC-21,17-DEC-98,19-JAN-20 in ascending order of their seniority. C. List the details of the employees whose salaries are more than the employee SHYAM. D. List the employee name along with department name and Location of all the employees working under 'ACCOUNTING' & 'RESEARCH' department and order by Department number. E. List the employees who are senior to RAJ working at BANGALORE & MYSORE location.	3	3	10

			OR			
	2	a)	Explain Three- Schema Architecture with a neat Diagram.	*1*	*1*	**5**
		b)	Analyze and complete the SQL query given below to create a View dept_salary to have minimum salary, maximum salary and Average Salary for each department. **Faculty** F_ID | F_name | Dnum | Email_ID | Salary **Department** Dname | Dnumber CREATE OR _____ dept_salary (_____) AS SELECT _____ FROM EMPLOYEE e, DEPARTMENT d WHERE _____ _____;	*2*	*2*	**5**
		c)	Given the following database design, write a SQL query for the following:  **Track**: Trak Id, Name, AlbumId, MediaTypeId, GenreId, Composer, Miliseconds, Bytes, UnitPrice **Genre**: GenreId, Name **Album**: Album Id, Title, ArtisId **Artist**: ArtistId, Name **PlaylistTrack**: PlaykustId, TrackId **Playlist**: PlaylistId, Name **Media Type**: MediaTypeId, Name A. List the names of an artist's who did not make any albums at all. B. List the artists name who did not record any tracks of the Latin genre. C. Display the trackid and track name of the video track which has the longest length. D. Display the space, in bytes, occupied by the playlist "Grunge", and also the price of it (Assume that the price of a playlist is the sum of the price of its constituent tracks).	*3*	*3*	**10**
			UNIT_II			
	3	a)	Write the ER diagram notations used for the following: i) Attribute ii) Composite Attribute iii) Multivalued Attribute iv) Derived Attribute v) Key Attribute vi) Entity	*1*	*1*	**5**

		b)	Convert the following ER diagram to schema diagram 	*2*	*2*	**5**
		c)	Write ER diagram for the following requirements (capture all the relationship constraints in the diagram): a) Customers (Cust-#) are categorized in account groups: A customer belongs to one account group (AGroup-#) only, while an account group may contain several customers. b) A customer may belong to several sales organisations (SalesOrg-#). Each sales organisation is linked to one or more distribution channels (DC-#). c) Each distribution channel is assigned to one or more divisions. d) Each customer has at least one address, e) Customer may operate with one or more international Trade.	*3*	*3*	**10**
			OR			
	4	a)	Explain select operation in relational algebra with an example.	*1*	*1*	**5**
		b)	Find the results of these expressions for the relational schema R and S R A B C D 1 2 3 4 2 2 5 1 3 4 2 6 4 2 5 3 S C D E 1 2 4 3 4 1 5 1 6 4 2 3 a. $R \bowtie S$ b. $R \bowtie_{R.C = S.C} S$ c. $R \bowtie_{R.A = S.C} S$ d. $R \bowtie_{R.A = S.E} S$	*2*	*2*	**5**
		c)	Consider the following schema: Suppliers (sid : integer, sname : string, address : string) Parts (pid : integer, pname : string, color : string) Catalog (sid : integer, pid : integer, cost : real)	*3*	*3*	**10**

			1. Find the name of suppliers who supply some red parts 2. Find the sids of suppliers who supply some red or green parts 3. Find the sids of suppliers who supply some red part and some green part 4. Find the sids of suppliers who supply every part 5. Find the sids of suppliers who supply every red part			
			UNIT-III			
	5	a)	Explain the relationship between Super key, Candidate key and Primary key with example.	*1*	*1*	**6**
		b)	Consider a relation- R (V , W , X , Y , Z) with functional dependencies- VW → XY Y → V WX → YZ Determine the candidate keys and the highest normal form the relation holds.	*2*	*2*	**6**
		c)	Given a relation R(X, Y, Z, W, P) and Functional Dependency set FD = { X → Y, Y → P, and Z → W}, determine whether the given R is in 3NF? If not convert it into 3 NF.	*2*	*2*	**8**
			UNIT - IV			
	6	a)	List and explain the approaches followed by NoSQL to solve the challenges faced by database systems.	*2*	*2*	**6**
		b)	Differentiate between SQL and NoSQL.	*2*	*2*	**6**
		c)	Design NoSQL queries considering MongoDB for the following. Consider a **db** database has collection named "blog" with the fields: (title, body, category, likes, tags, date) i. Display details of the documents for which the category is "news" ii. Update likes to 2 for which the title is "BMS" iii. Display documents which achieved a score more than 90 for likes. iv. Display the documents in the descending order of date v. Determine Minimum and Maximum likes for each category	*3*	*3*	**8**
			UNIT - V			
	7	a)	List and explain the properties of Transactions.	*1*	*1*	**6**
		b)	Consider the following two transactions:	*2*	*2*	**6**

			T_{31}: read(A);
			read(B);
			if $A = 0$ **then** $B := B + 1$;
			write(B).
			
			T_{32}: read(B);
			read(A);
			if $B = 0$ **then** $A := A + 1$;
			write(A).
			
			Add lock and unlock instructions to transactions T31 and T32, so that they observe the two-phase locking protocol.			

		c)	Consider following schedule. Determine whether each schedule is Strict, Cascadeless, Recoverable or non-recoverable. Provide justification to your answer. 1. R1(X), W1(X), R1(Y), W1(Y), C1, R2(X), W2(X), C2 2. R1(X), W1(X), R1(Y), W1(Y), R2(X), W2(X), C2, C1 3. R1(X), R2(X), W1(X), R1(Y), W1(Y), C1, W2(X), C2 4. R1(X), R2(X), W2(X), W1(X), C2, R1(Y), W1(Y), C1	*2*	*2*	**8**

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