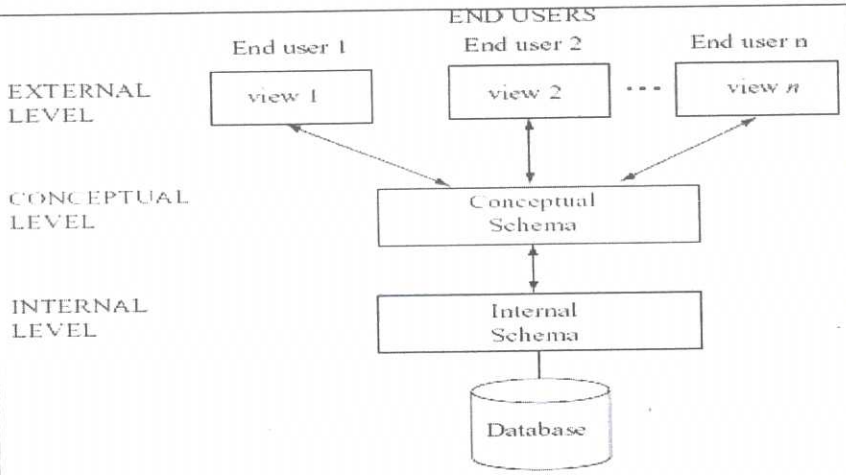
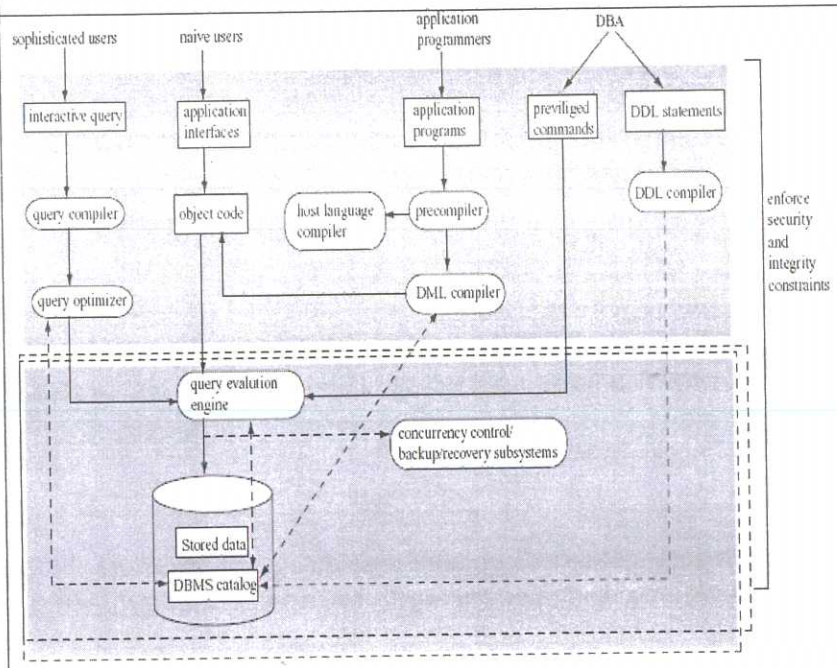
DATABASE MANAGEMENT SYSTEM

TED (15) -3132

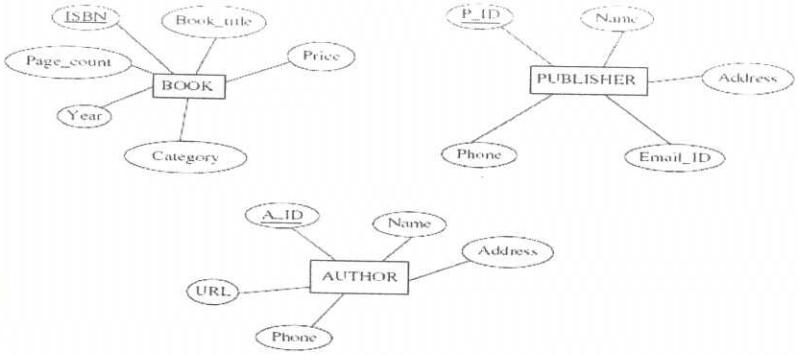
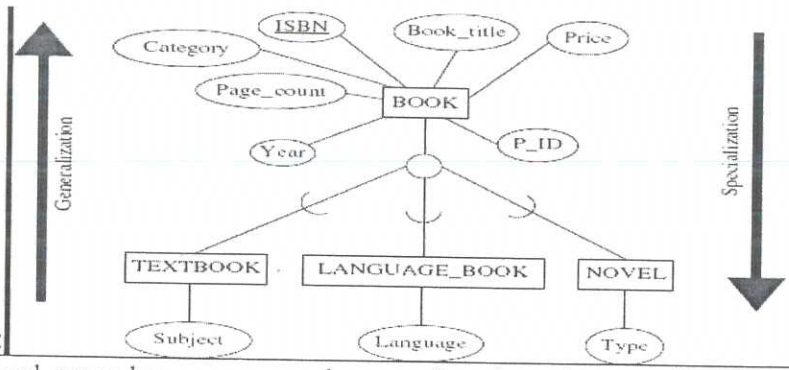
Qno	Scoring Indicators	Split score	Total score
I	PART A		
1	Data Redundancy- Duplication of data.	2	2
2	-Database users(Naïve users, Sophisticated users, Specialized users) -System analysts -Database administrator.	2	2
3	Attribute of one relation can be accessed in another relation by enforcing a link between the attributes of two relation.	2	2
4	LIKE operator used in the WHERE clause to search for a specified pattern in a column. IN operator allows you to specify multiple values in a WHERE clause. Shorthand for multiple OR conditions.	2	2
5	Deletion anomaly occurs when you delete a record that may contain attributes that should n't be deleted.	2	2
II	PART B		
1	1.Internal level- physical level. -deals with physical representation of data. -how the data is physically stored and organized on the storage medium. 2.Conceptual level:-logical level. -describes what data is stored in the database. 3.External level:-view level. -deals with user's view of the database, permits users to access data in a way that is customized according to their needs.	Exp-3 Fig-3	6





2		fig 3 exp3	6

1. Data definition-DBA define database,make changes to its definition using DDL commands.
   -DDL compiler processes and stores schema descriptions in the data dictionary.
2. Data Manipulation-insertion,deletion,modification of records.
3. Data security and integrity-contains functions to handle the security and integrity of data stored in the database.
4. Concurrency and data recovery-functions dealing with the concurrent access of records by multiple users and the recovery of

	data after a system failure. 5.Performance optimization-evaluate different execution plans of a query and choose the best among them. -		
3	E-R diagram is a graphical tool that demonstrates the interrelationships among various entities of a database. -emphasis on the schema of the database. Eg:  	Exp3 Eg 3	6
4	Specialization- top-down design approach. -the process of refining the superclass into subclasses by adding some additional features to each of them. Generalization-bottom-up approach. -multiple lower-level entity types are combined on the basis of common features to form higher-level entity types. Eg:  	Exp3 Eg 3	6
5	Stored procedures are procedures or functions that are stored and executed by the DBMS at the database server machine. -procedures improve performance. -Stored procedures are beneficial when a procedure is required by different applications located at remote sites, as it is stored at server site and can be invoked by any of the applications. CREATE PROCEDURE <name> (<parameters1, ..., parametersn >) <local_declarations>	3+3	6

	<body of procedure>; Eg:		
6	• **NOT NULL** - Ensures that a column cannot have a NULL value • **UNIQUE**- Ensures that all values in a column are different • **PRIMARY KEY** - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table • **FOREIGN KEY**- Uniquely identifies a row/record in another table • **CHECK** - Ensures that all values in a column satisfies a specific condition • **DEFAULT**- Sets a default value for a column when no value is specified • **INDEX**- Used to create and retrieve data from the database very quickly.	6	6
7	1. Sharing data 2. Improved availability and reliability Availability-probability that the system is running continuously throughout a specified period. Reliability-probability that the system is running at any given point of time. 3. Autonomy-all operations at a given site are controlled by that site. 4. Easier expansion-more processors or sites can be added as needed with little effort.	6	6
	PART C		
III (a)	Duties of DBA are: 1. Schema definition and modification. 2. New software installation. 3. Security enforcement and administration. 4. Data analysis. 5. Preliminary database design. 6. Physical organization modification. 7. Routine maintenance checks.	7	7
(b)	-data maintained in the form of tables. -row represents entity and column represents attribute of an entity. -relationship between tables represented by common attributes, no physical links.	8	8

Eg;

BOOK

ISBN	Book_title	Category	Price	Copyright_date	Year	Page_count	P_ID
001-354-921-1	Ransack	Novel	22	2005	2006	200	P001
001-987-760-9	C++	Textbook	25	2004	2005	800	P001

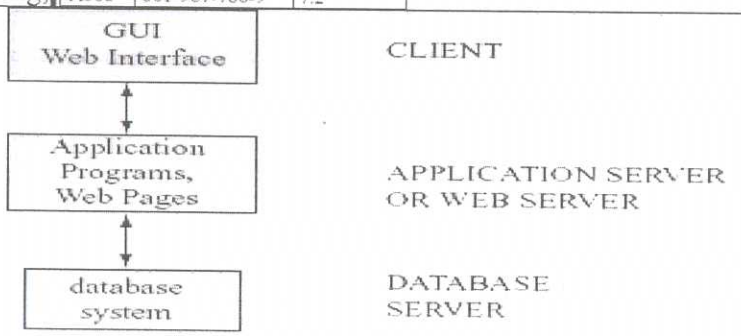
PUBLISHER

P_ID	Pname	Address	State	Phone	Email_ID
P001	Hills Publications	12, Park street, Atlanta	Georgia	71340 19	H_pub@hills.com

REVIEW

R_ID	ISBN	Rating
A002	001-987-760-9	6.0
A006	001-354-921-1	7.5
A008	001-987-760-9	7.2

IV (a)



-used for web-based applications.
-adds intermediate layer, application server between client and database server.
-client communicates with the application server which in turn communicates with the database server.
-application server stores the business rules used for accessing data from database server.
-it checks clients credentials before forwarding a request to database server.
-when client requests for information, application server accepts the request, processes it and sends corresponding data commands to database server.
-database server sends the result back to application server which is converted into GUI format and presented to the client.

7 | 7

(b)

1. Controlled data redundancy.
2. Enforcing data integrity.
3.Data sharing
4.Ease of application development.
5.Data security
6. Multiple user interface.
7.Backup and recovery.

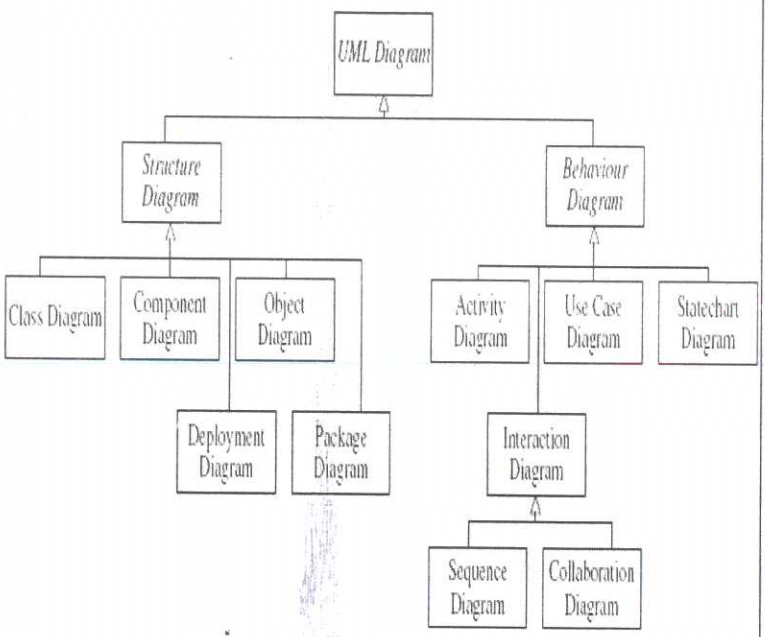
8 | 8

V (a)

Super key- A set of one or more attributes which can uniquely identify a row in a table.
Eg:Book{ISBN,book_title,category}->superkey=ISBN

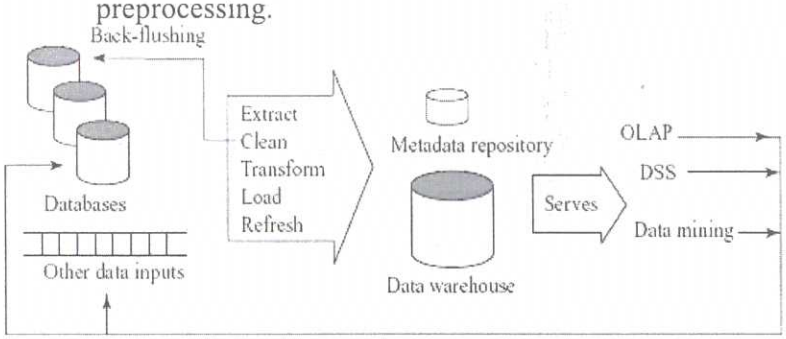
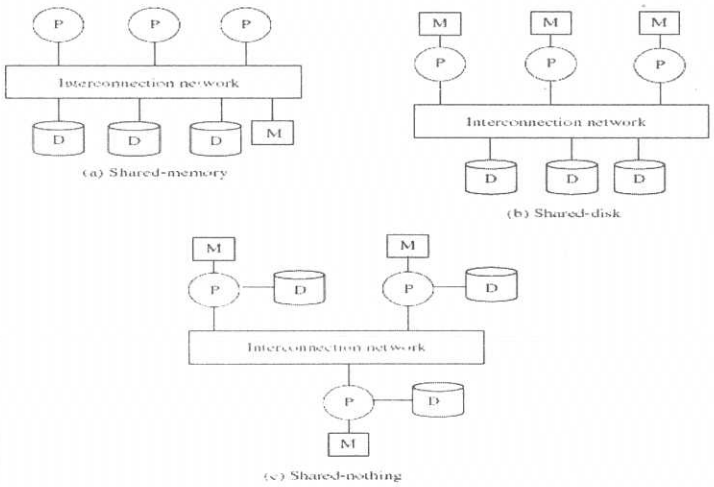
6

	Candidate key- super keys with minimal set of attributes. Eg:ISBN Alternate key-candidate keys that are not chosen as primary key. Eg:ISBN and book_title are candidate keys.if ISBN chosen as primary key,book_title becomes alternate key.	6	
(b)	Unary operations-operations on a single relation. 1.Select operation-retrieves all those tuples from a relation that satisfies a condition. 2.Project operation-select some required attributes from a relation discarding the other attributes. 3.Rename operation-used to provide name to the relation after applying any relational algebra operation. Binary operation-operations operating on two relations. 1. Union operation-returns a relation that contains tuples from both of the operand relations. 2. Intersection-contains tuples common to both relations. 3. Difference-contains all relations present in on Trelation which are not present in the second relation. 4. Cartesian product-contains all possible combinations of the tuples from the two operand relations. 5. Joins-joins two relations to form a new relation on the basis of one common attribute present in the two operand relations. 1. Equijoin 2. Natural join 3. Outer join 6. Division-set of all values of attribute A,such that for every value of attribute B in R2,there is a tuple (A,B) in R2. Examples	9	9
VI (a)	Natural Join-if one of the two identical attributes is removed from the result of equijoin it is known as natural join. Eg: Outer join-selects all the tuples satisfying the join condition along with the tuples for which no tuples from the other relation satisfy the join condition. 1.Left outer join-includes all those tuples from both the relations satisfying the join condition along with all the tuples in the left relation that do not have a corresponding tuple in the right relation. 2. Right Outer Join- includes all those tuples from both the relations satisfying the join condition along with all the tuples in the right	4+4	8

	relation that do not have a corresponding tuple in the left relation. 3. Full Outer Join-combines the result of both the left and the right outer joins. Eg:		
(b)	Unified Modelling Language implement object data modeling. -UML diagrams include a number of diagrams used to create an abstract model of an system. 1. Structural diagrams-describe the static or structural relationship among various components of the system. Eg: class diagram, package diagram, object diagram, component diagram, deployment diagram. 2. Behavioural diagrams-describe the dynamic or behavioral relationships among the various components of the system. Eg: use case diagram,statechart diagram,activity diagram. 3. Interaction diagrams-models the dynamic characteristics of the system by representing the set of messages exchanged among a set of objects. Eg: sequence diagram, collaboration diagram.  	4+3	7
VII (a)	Aggregate functions-processes a set of values taken as input and returns a single value as a result. 1. AVG- calculates the average values of a set of values. Eg: SELECT AVG(Price) FROM BOOK; 2. MAX-To find the maximum values from set of values.		

	Eg:SELECT MAX(Price) FROM BOOK WHERE Category='Novel' 3. COUNT- To count the total number of tuples in the resultant relation. Eg:SELECT COUNT(*) FROM PUBLISHER; 4. MIN-To find the minimum value from a set of values. Eg:SELECT MIN(Price) FROM BOOK WHERE Category='Novel' 5. SUM-To find the sum total of all values.	7	7
(b)	Subquery-the query defined in the WHERE clause of another query. -the query in which another query is nested is called enclosing query. -the result returned by the subquery is used by the enclosing query for specifying the conditions. Eg: SELECT ISBN,Book_title,Category FROM BOOK WHERE PRICE=(SELECT MIN(Price) FROM BOOK); Operators used in subqueries are: 1. ANY-compares a value with any of the values in the list or returned by the subquey. 2. IN-to compare a single value to the set of multiple values. 3. ALL-compares a value to every value in a list returned by the subquery. 4. EXISTS-evaluates to true if a subquery returns atleat one tuple as a result otherwisefalse value.	Exp 5 Eg 3	8
VIII (a)	A trigger is a type of stored procedure that is executed automatically when some database related events like, insert, update, delete, etc., occur. - triggers do not accept any arguments. -triggers are needed for following purposes: 1. Implementing and maintaining complex integrity constraints. 2. Recording the changes for auditing purposes. 3. Automatically passing signal to other programs that action needs to be taken whenever specific changes are made to a relation. - A trigger consists of three parts: 1. Event 2. Condition 3. Action CREATE TRIGGER <trigger_name> [BEFORE or AFTER] [INSERT or UPDATE or DELETE] ON <relation_name> [FOR EACH ROW] WHEN <condition> <statements>;	Exp 4	

	Eg:	Eg 3	7
(b)	View- a virtual relation,wose contents are derived from already existing relations and it does not exist in physical form. It can be queried,inserted into, deleted from and joined with other relations or views. -CREATE VIEW command used to create a view. -CREATE VIEW <viewname> AS <subquery> -Eg: CREATE VIEW BOOK_1 AS SELECT * FROM BOOK WHERE Category IN ('Textbook','Language Book'); -DROP VIEW viewname –used to delete a view. **ODBC(Open Database Connectivity)** - provides an application programming interface (API) that the application programs can use to establish a connection with the database. - Once the connection is established, the application program can communicate with the database through queries. -An application program from the client-site can access several DBMSs by making ODBC API call. - The requests from the client program are then processed at the server-sites and the results are sent back to the client program.	5 3	8
IX (a)	Acquisition of data for the warehouse involves the following steps: 1. The data is extracted from multiple, heterogeneous data sources. 2. The task of correcting and preprocessing the data is called data cleansing. 3. the data managers in the organization want to upgrade their data with the cleaned data. This process is known as back-flushing. 4. The cleaned and transformed data is finally loaded into the warehouse. 5. Data is partitioned, and indexes or other access paths are built for fast and efficient retrieval of data. 6. This entire process of getting data into the data warehouse is called extract, transform, and load (ETL) process 7. At the backend of the process, OLAP, data mining, and DSS may generate new relevant information such as rules and patterns. This information is sent back to the data warehouse. Once the data is loaded into a warehouse, it must be periodically refreshed to reflect the updates on the relations at the data sources and periodically purge old data. The updates of a warehouse are handled by the acquisition component of the warehouse that provides all required	4+4	8

	preprocessing.  		
(b)	Parallel DBMS seeks to improve performance by carrying out many operations in parallel, such as loading data, processing queries. 1.Shared memory 2.Shared nothing 3.Shared disk.  	Exp4 Fig3	7
X (a)	1NF- A relation schema R is said to be in first normal form (1NF) if and only if the domains of all attributes of R contain atomic (or indivisible) values only. 2NF- A relation schema R is said to be in second normal form (2NF) if every non-key attribute A in R is fully functionally dependent on the primary key. 3NF- A relation schema R is in third normal form (3NF) if and only if it satisfies 2NF and every nonkey attribute is non-transitively dependent on the primary key. BCNF- A relation schema R is in Boyce-Codd normal form (BCNF) if, for every FD $X \rightarrow A$ in F, where X is the subset of the attributes of R, and A is an attribute of R, one of the following statements holds:	2X4	8

	1. $X \rightarrow Y$ is a trivial FD, that is, $Y \subseteq X$. 2. X is a superkey.		
(b)	1. Data selection or extraction: The entire raw dataset is examined to identify the target subset of data and the attributes of interest. 2. Data cleansing or preprocessing: The data is cleaned to minimize errors and fill in missing information, wherever possible. 3. Enrichment: The data is enhanced with additional sources of information. 4. Data transformation or encoding: The data is categorized under different groups in terms of categories, ranges, geographical regions, and so on. This may be done to reduce the amount of data stored in the database. 5. Data mining: The data mining is applied to discover useful patterns and rules. 6. Interpretation or evaluation: The patterns are presented to the users in easily understandable and meaningful formats such as listings, graphical outputs, summary tables or visualizations.	7	7