UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2022 – 1st Year Examination – Semester 2

IT2306 – Database Systems

Multiple Choice Question Paper

(TWO HOURS)

Important Instructions :

- The duration of the paper is **2 (two) hours**.
- The medium of instructions and questions is English.
- The paper has **40 questions** and **10 pages**.
- All questions are of the **MCQ** (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry **equal** marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from -1 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*). However, the minimum mark per question would be zero.
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
- **All kinds of electronic devices including calculators are not allowed.**
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1) What are the possible issues triggered by redundant data?

(a) Duplication effect
(b) Improves data integrity
(c) Lower the risk of errors.
(d) Performance issues
(e) Maintenance issues

2) What feature(s) does data normalization provide in a database system?

(a) Degrade the quality of the database
(b) Ensure consistency
(c) Minimize data redundancy
(d) Save storage space.
(e) Helps to achieve operational efficiency and performance.

3) Which of the following statements is/are **correct** regarding database approaches?

(a) Data Definition Languages (DDL) permit specifying data types, structures, and constraints.
(b) Data Manipulation Language (DML) supports data manipulation by querying data.
(c) In Data Definition Languages (DDL), all specifications are not stored in the database.
(d) Data Manipulation Language (DML) does not support the most common SQL statements.
(e) Data Control Language (DCL) and Transaction Control Language (TCL) are not part of database approaches.

4) Which of the following statements is/are **correct** regarding Data Definition Languages (DDL)?

(a) CREATE is used to create a database and its objects such as tables, functions, views …etc.
(b) ALTER will revise the structure of the existing database.
(c) TRUNCATE will remove all data records from a table but keeps the space allocated for the table.
(d) DROP will delete the entire table, including the table structure and all data stored within the table.
(e) RENAME will change the name of the table or a database object. rename the name of tables only.

5) Which of the following is/are **NOT** (a) component(s) that belong(s) to the database system environment?

(a) Operating system, application program, and user interface.
(b) Rules and procedures that need to apply to the database.
(c) Set of physical devices that the database resides.
(d) Software development life cycle.
(e) Unprocessed data.

6) Which of the following is/are **NOT** (a) characteristic(s) of a data model?

(a) Consistency constraints
(b) Data
(c) Relationships
(d) Semantics
(e) SQL queries

7) Which of the following statements is/are **correct** regarding data model categorization?

(a) High-level conceptual models provide concepts that are closer to how end users perceive data.
(b) Logical data models are not quite easily understood by users and it is a bit far from data storage.
(c) Low level data models such as physical data models or database schemas describe details of how data is stored in computer storage media.
(d) Relational data models are an example of logical data models.
(e) Entity Relationship model is a popular relational data model.

8) Which of the following data model categorization does the Entity Relationship model belong to?

(a) Conceptual data model
(b) Logical data model
(c) Physical data model
(d) Hardware layer data model
(e) Middleware layer data model

9) Which of the following statements is/are **correct** regarding formal relational data model terminology?

I. A row is called a tuple and a column header is called an attribute.
II. A table is called a relation.
III. The data type describing the types of values that can appear in each column is called a domain.

(a) Only I is correct
(b) Only I and II are correct
(c) Only I and III are correct
(d) Only II and III are correct
(e) I,II and III are correct

10) Which of the following statements is/are **correct** regarding "ER Diagrams" ?

(a) ER diagrams are used to represent entity relationship models in a database.
(b) ER diagrams can be easily converted into relations (tables).
(c) ER diagrams require extensive technical and hardware support from the database admin.
(d) ER diagrams model the physical view of the system from a data perspective.
(e) ER diagram gives a standard solution to visualize data logically.

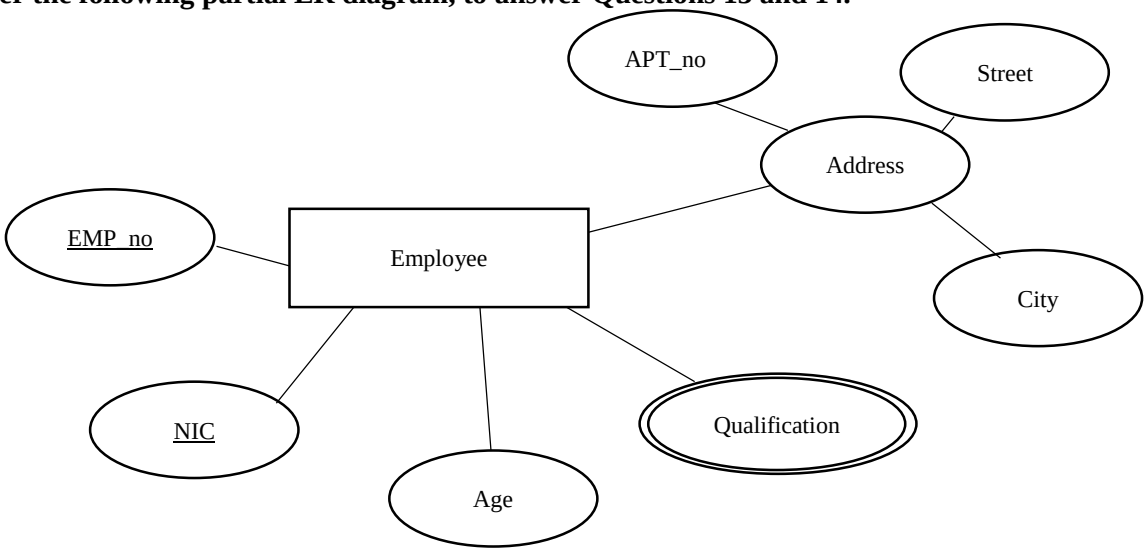
11) Which of the following statements is/are **correct** regarding ER Diagram components?

(a) Strong entity does not depend on other entities in the schema.
(b) Strong entity contains a primary key that helps to identify it uniquely.
(c) Weak entity cannot be uniquely identified from the entity set.
(d) Weak entity represented by a single-line rectangle.
(e) Strong entity is represented by a double-line rectangle.

12) Which of the following is/are (an) objective(s) of the conceptual scheme in conceptual design?

(a) User requirement collection
(b) Ensure user requirements are collected and do not include any conflicts.
(c) Solving conflicts in user requirements.
(d) Drawing ER diagram.
(e) Verifying ER diagram matches user requirements.

Consider the following partial ER diagram, to answer Questions 13 and 14.



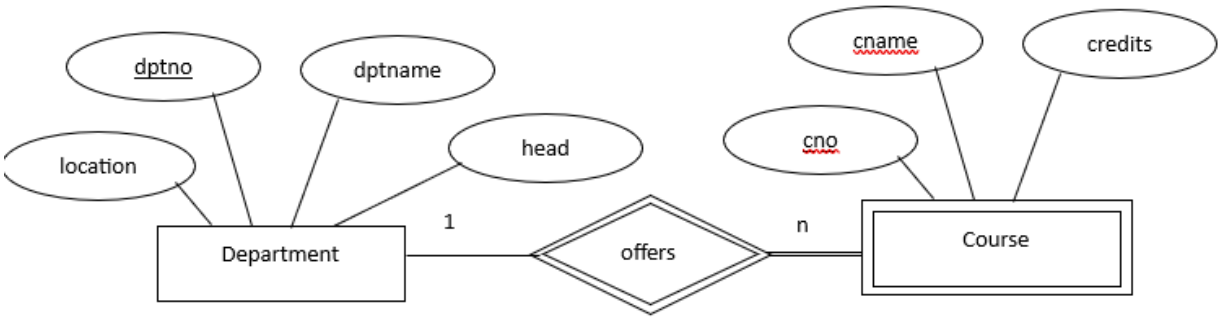
13) Which of the following can be considered as a composite key in the above ER diagram?

(a) EMP_no
(b) Qualification
(c) NIC
(d) Address
(e) Employee

14) Which of the following can be considered as a multivalued attribute in the above ER diagram?

(a) EMP_no
(b) Qualification
(c) NIC
(d) Address
(e) Employee

Consider the following partial ER diagram, to answer Questions 15 and 16



15) Which of the following can be considered as the attributes of the Department relation after applying mapping rules ?

(a) dptno, location, dptname, head
(b) dptno, location, dptname, head
(c) dptno, location, dptname, head
(d) dptno, location, dptname, head, cno
(e) dptno, location, dptname, head, cno

16) Which of the following can be considered as the attributes of the Course relation after applying mapping rules ?

(a) cno, cname,credits
(b) cno, cname,credits,*dptno*
(c) cno, cname,credits,*dptno*,head
(d) cno, cname, credits,*dptno*
(e) *dptno*, cno

17) Which of the following statements is/are **correct** regarding an ER diagram?

(a) Total participation in an ER diagram is shown in a double line.
(b) In an ER diagram we can frequently see many-to-many relationships than one-to-one.
(c) Partial participation is shown in a single line in an ER diagram.
(d) In an ER diagram, there can be defined only two kinds of cardinality namely, one to many and many to many.
(e) In partial participation, an entity may not participate in the relationship but in total participation, both entities must participate in the relationship.

18) Which of the following statements is/are **correct** regarding relationships in an ER diagram?

(a) Degree of a relationship set is known as the number of different entity sets participating in a relationship.
(b) In a unary relationship, one or more entity sets can participate in a relationship.
(c) In a binary relationship, only two entities participate in a relationship.
(d) In a ternary relationship, three or more different entities take part in a relationship.
(e) In a binary relationship, there can be three types of cardinalities such as one-to-one, one-to-many and many-to-many.

19) Which of the following is/are **true** regarding an ER diagram?

(a) An entity that shares common attributes or relationships is called a subclass.
(b) Many subclasses can be created from a superclass.
(c) In inheritance, the child class gets partial details from the parent class.
(d) A subclass is derived from the superclass and inherits properties of the superclass and contains attributes of its own.
(e) A subclass cannot contain any other attribute apart from the superclass.

20) What is the corresponding relational algebra that matches the following scenario.

Retrieve all students who either enrolled in 4 courses and score over 3.50 GPA, or enrolled in 5 courses and score over 3.70 GPA.

(a) $\sigma_{(Cno=4\ AND\ GPA>3.50)\ OR\ (Cno=5\ AND\ GPA>3.70)}$ (STUDENTS)
(b) $\sigma_{(Cno=4\ AND\ GPA>3.50)\ ,\ (Cno=5\ AND\ GPA>3.70)}$ (STUDENTS)
(c) $\sigma_{(Cno=4\ AND\ GPA>3.50)\ AND\ (Cno=5\ AND\ GPA>3.70)}$ (STUDENTS)
(d) $\sigma_{(Cno=4\ AND\ GPA>3.50)\ |\ (Cno=5\ AND\ GPA>3.70)}$ (STUDENTS)
(c) $\sigma_{(Cno=4\ OR\ GPA>3.50)\ OR\ (Cno=5\ OR\ GPA>3.70)}$ (STUDENTS)

21) Which of the following statements is/are **correct** regarding SELECT operation in relational algebra?

(a) SELECT is a unary operation.
(b) SELECT operation is commutative.
(c) SELECT operation chooses the subset of tuples when the relation satisfies the given condition according to the given syntax.
(d) SELECT operation is also known as vertical partitioning.
(e) SELECT is known as the restriction operation.

22) Which of the following relational operation creates a vertical partition of the relation by filtering out attributes of the tuples that are not specified in the list ?

(a) σ
(b) π
(c) $\bowtie$
(d) *
(e) P

23) Which of the statements is/are **TRUE** regarding SQL?

(a) It is a relational database language.
(b) It is a powerful Data Manipulation Language.
(c) It is a database management system to efficiently deal with databases.
(d) SQL is a procedural programming language.
(e) SQL can be only used for relational databases.

24) Which of the following statements is/are **incorrect** regarding the role of SQL?

(a) It is a database administration language.
(b) It is a database programming language.
(c) Does not support client/server architecture.
(d) It is a distributed database language.
(e) SQL is vendor independent.

25) Which of the following statements is/are **TURE** regarding SQL?

(a) In relational databases, data is stored and retrieved in the form of relations.
(b) In a relation, a tuple is known as a column.
(c) Cardinality is the number of tuples in a relation.
(d) Aggregation functions are used to perform mathematical operations on data values of a relation.
(e) GROUP BY cannot always be used with aggregation function.

26) Which of the following statements is/are **TURE** regarding data integrity?

(a) Integrity constraints ensure that the data insertion, updating, and other operations are performed without affecting the data integrity.
(b) Integrity constraints guard the data against accidental damage to the database.
(c) Declarative referential integrity enables eliminating the possibility of programming errors.
(d) The overall precision and completeness of data is known as data integrity.
(e) Data integrity cannot ensure data can be protected from outside influences.

27) What is the **correct** SQL statement to create a unique index named "ids_lname" on the "lname" column in the employee table?

(a) CREATE UNIQUE INDEX ids_lname ON employee (lname);
(b) CREATE UNIQUE INDEX ids_lname ON employee.lname;
(c) CREATE INDEX ids_lname ON employee (lname);
(d) CREATE INDEX ids_lname ON employee.lname;
(e) CREATE INDEX ids_lname ON lname;

28) What is/are the **correct** SQL statement(s) to delete an index named "idx_fname" on the employee table?

(a) DROP INDEX employee.idx_fname;
(b) DROP INDEX employee idx_fname;
(c) DROP INDEX employee ON idx_fname;
(d) DROP INDEX idx_fname.employee;
(e) DROP INDEX idx_fname ON employee;

29) What is the **correct** SQL statement to list the number of distinct employee cities?

(a) SELECT COUNT(DISTINCT city) FROM DISTINCT employee;
(b) SELECT COUNT(DISTINCT city) FROM employee;
(c) SELECT COUNT DISTINCT (city) FROM employees;
(d) SELECT COUNT(city) FROM DISTINCT employees;
(e) SELECT COUNT(city) DISTINCT employees;

30) What is the **correct** SQL statement to delete all rows in the "employee" table without deleting the table itself?

(a) DELETE FROM employee WHERE *;
(b) DELETE FROM employee;
(c) DELETE * FROM employee;
(d) DELETE employee;
(e) Employee DELETE;

Consider the following toy table when answering questions 31-33.

toyID	toyname	agegroup	price	supliderid
1	doll	3	$50	1001
2	bear	4	$20	2002
3	car	5	$30	1001
4	fruits	4	$40	3001
5	vegetables	2	$59	2003

31) What is the **correct** SQL statement to select all toys with an age limit between 3 to 5 ?

(a) SELECT * FROM toy WHERE age is 3 AND 5;
(b) SELECT FROM toy WHERE age is 3 AND 5;
(c) SELECT FROM toy WHERE age BETWEEN 3 AND 5;
(d) SELECT * FROM toy WHERE age BETWEEN 3 AND 5;
(e) SELECT FROM toy WHERE age (3,5);

32) What is the **correct** SQL statement to find the most expensive toy ?

(a) SELECT MAX.Price FROM toy;
(b) SELECT * MAX.Price FROM toy;
(c) SELECT MAX(Price) FROM toy;
(d) SELECT MAX(Price) toy;
(e) SELECT MAX(toy);

33) What is the **correct** SQL statement to select first three (3) records in the toy table ?

(a) SELECT ALL FROM toy LIMIT 3;
(b) SELECT * FROM toy LIMIT 3;
(c) SELECT * FROM LIMIT 3 toy;
(d) SELECT * FROM LIMIT= 3 toy;
(e) SELECT ALL FROM LIMIT= 3 toy;

34) Which of the following **CANNOT** be considered as (a) threats to a database?

(a) Loss of integrity
(b) Loss of availability
(c) Loss of confidentiality
(d) Loss of access control
(e) Loss of governmental policy

35) Which of the following can be (a) security implication(s) for a database system?

(a) Maintenance delays.
(b) Unauthorized access.
(c) Policy issues regarding credit rating.
(d) System related issues.
(e) Revising access controls in a database.

36) Which of the following statements is/are **TURE** regarding database security?

(a) Database security refers to protecting the database from unauthorized or malicious use.
(b) Frequent backups help to enhance database security.
(c) Database security considers unauthorized modification and destruction of data.
(d) Incorporate combinations of authorization views to control unauthorized users.
(e) Incorporating RAID does not enhance database security in terms of data replication.

37) Which of the following statements is/are **TURE** regarding data normalizing ?

(a) Helps to eliminate anomalies of the data.
(b) Helps Identify how to handle missing values.
(c) Helps to get rid of inconsistencies of data.
(d) Lists suitable set of relations that supports data requirements.
(e) Provide suitable means of storing data efficiently.

Consider the following relational table for question 38:

Order ID	Customer ID	Order Date	Product ID	Product Name	Quantity
1	101	2023-01-15	001	Laptop	2
2	101	2023-02-10	002	Smartphone	3
3	102	2023-01-20	001	Laptop	1
4	103	2023-03-05	003	Tablet	2
5	102	2023-02-28	001	Laptop	2
6	103	2023-04-12	002	Smartphone	1

38) Which of the following normalization form is the above table in?

(a) First normal form
(b) Second normal form
(c) Third normal form
(d) Boyce-Codd normal form
(e) Fourth normal form

39) Which normal form eliminates redundant data ensuring dependency considering only its relationship to primary key ?

(a) First normal form
(b) Second normal form
(c) Third normal form
(d) Boyce-Codd normal form
(e) Fourth normal form

40) Which of the following is **NOT** an application of normal forms in Database Management System?

(a) Ensure data is consistent and does not contain redundant data.
(b) Improve query performance.
(c) Make easier to maintain databases.
(d) Provide guidelines to efficiently design databases.
(e) Reduce the risk of center point failures to the database.

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