



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2020 – 1st Year Examination – Semester 2

IT2306 – Database Systems
Multiple Choice Question Paper

(TWO HOURS)

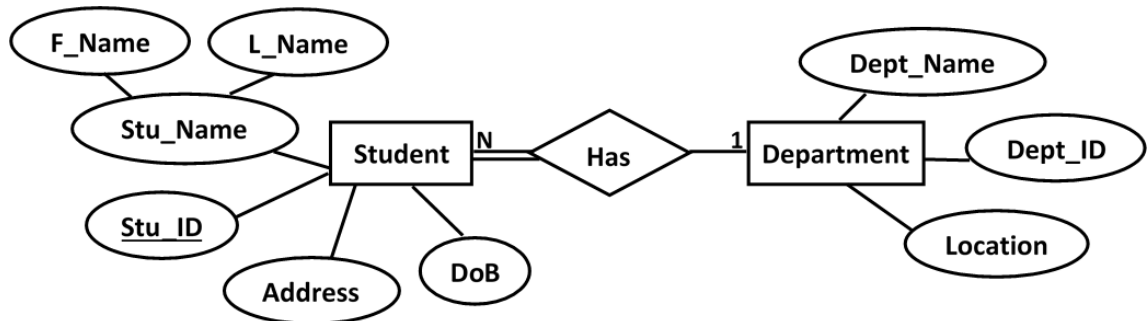
Important Instructions:

- The duration of the paper is **2 (two) hours**.
- The medium of instruction and questions is English.
- The paper has **40 questions** and **12 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 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- 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.**
- Calculators are **not** allowed.
- *All Rights Reserved.*

- 1) Which of the following statements is/are correct about **Data Redundancy**?
- (a) It is a problem with traditional file systems.
 (b) It is reduced by normalization.
 (c) It has no effect on the cost and maintenance of a system.
 (d) It can lead to inconsistency of data.
 (e) It has no effect on data integrity.
- 2) Which of the following statements is/are correct in relation to the ANSI/SPARC architecture?
- (a) Any given database has exactly one conceptual schema, but it may have several physical and external schemas.
 (b) The logical view is a single description of the data elements and their relationships.
 (c) A data definition language is used to define the internal schema.
 (d) Does not allow hiding confidential data from users.
 (e) The physical design is the responsibility of the Database Administrator.
- 3) Which of the following statements is/are true regarding actors on the database systems?
- (a) The person who has the central responsibility of the data in an organization is called a Database Administrator.
 (b) Authorizing access to the database is performed by a Database Designer.
 (c) Naive users require knowledge only on few facilities that they may use repeatedly.
 (d) Defining the data policy of the organization is a responsibility of Database Administrator.
 (e) Communicating with end-users and understanding their needs is a responsibility of Database Designer.
- 4) Given below are four steps in the database design process.
- Selecting a suitable Database Management System (DBMS).
 - Identifying and document the data requirements of the system.
 - Specifying internal storage structures, file organizations, indexes.
 - Identifying the entity types, relationships, and constraints.
- Which of the following gives the **correct order of operations** in database design?
- (a) I, II, III, IV (b) I, II, IV, III (c) II, IV, I, III
 (d) II, IV, III, I (e) II, I, IV, III
- 5) Which of the following statements is/are correct with respect to the relational data model?
- (a) Values in a tuple of the relation are atomic.
 (b) The range of values of an attribute is defined by the degree.
 (c) Tuples in a relation represent distinct attributes of the entity.
 (d) Columns in a table reflect the distinct instances of the corresponding entity.
 (e) The cardinality of a domain refers to the total number of values in the domain.
- 6) Which of the following statements is/are correct with respect to concept of keys in the relational data model?
- (a) A super key is the minimal key.
 (b) A key may have more than one attribute.
 (c) Any super key can be selected as the primary key of the relation.
 (d) A key with only one attribute can be selected as the primary key
 (e) Both a super key and a key specifies a uniqueness constraint on tuples.

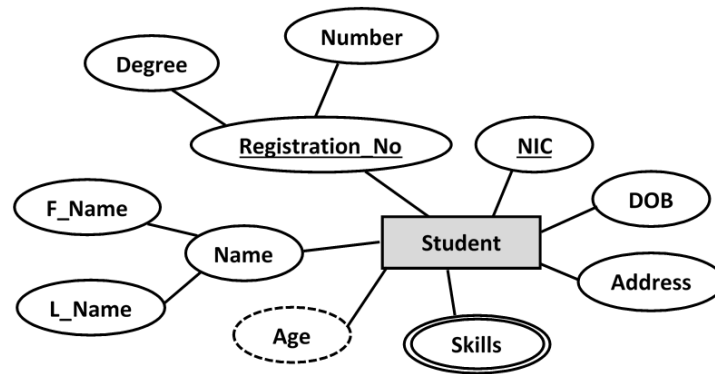
- 7) Consider statements I – III about a ‘Student’ relation from a University relational schema.
- I. Every student should be given a unique student id which cannot be NULL.
 - II. Email address of every member should be unique.
 - III. Every member must be of 18 years of age or older.
- Which of the following options correctly identifies the type of relational constraints corresponding to statements I-III?
- (a) I – key constraint, II – domain constraint, III – entity integrity constraint.
 - (b) I – referential integrity constraint, II - key constraint, III – entity integrity constraint.
 - (c) I – entity integrity constraint, II – key constraint, III – domain constraint.
 - (d) I – entity integrity constraint, II – key constraint, III – none of the relational model constraints.
 - (e) I – key constraint, II – entity integrity constraint, III – none of the relational model constraints.
- 8) If the attribute A1 in relation R1 has a foreign key that references a relation R2 which of the following statements is/are true?
- (a) R1 is the referenced relation.
 - (b) For any tuple in R1 Value of A1 cannot be NULL.
 - (c) Domain of A1 must match the domain of the primary key field of R2
 - (d) Primary key field of R1 should be named as ‘A1’.
 - (e) For any tuple in R1, value of A1 occurs as a value of the primary key field in some tuple in R2.

Consider the following ER diagram (ERD) when answering the questions (9) and (10).



- 9) Which of the following statements is/are correct regarding the above ER diagram?
- (a) Student can be associated with many departments, and a department should have at least one student.
 - (b) Department may exist without any students.
 - (c) Every student should belong to a department.
 - (d) Department is an identifying entity.
 - (e) Relationship between Department and Student is binary, Many to One relationship.
- 10) Which of the following relations is possible if the above ERD is mapped into a relational model?
- (a) Department (Dept_ID, Stu_ID, Dept_Name, Location)
 - (b) Student (Stu_ID, Stu_Name, F_Name, L_Name, Address, DoB, Dept_ID)
 - (c) Student (Stu_ID, F_Name, L_Name, Address, DoB)
 - (d) Student (Stu_ID, F_Name, L_Name, Address, DoB, Dept_ID)
 - (e) Has (Stu_ID, Dept_ID)

- 11) Consider the following ER diagram (ERD) fragment.

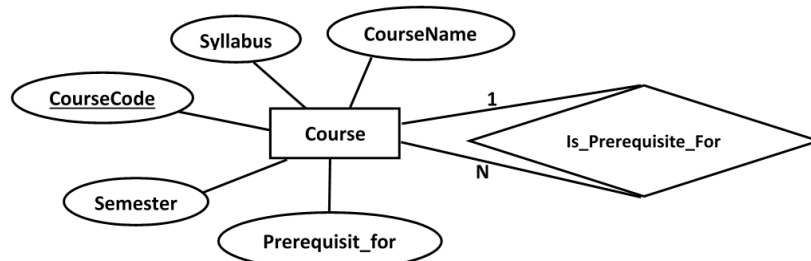


Which of the following statements is/are correct?

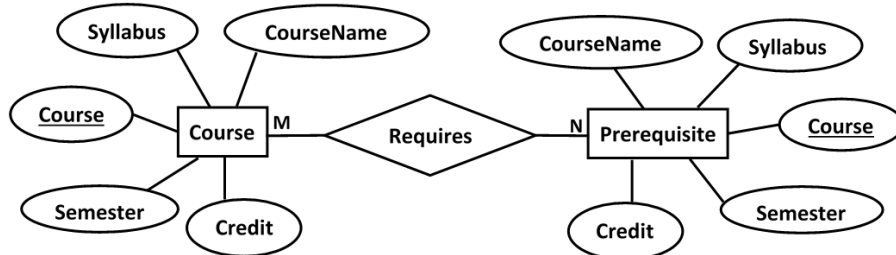
- (a) "Student" is a strong entity.
- (b) "Degree" and "Number" are key attributes.
- (c) "Age" is a weak attribute.
- (d) "Skills" is a composite attribute.
- (e) "Name" is a multi-valued attribute.

- 12) Consider a scenario where a course may require learning many other courses as prerequisites, and each course may be taught as a prerequisite to many other courses. Given below are four (4) ER diagrams drawn by students to depict the above scenario.

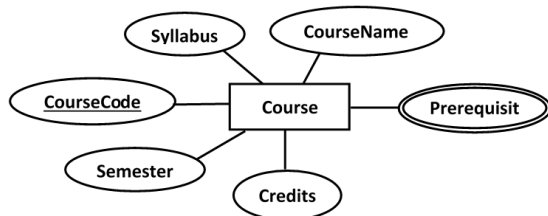
I.



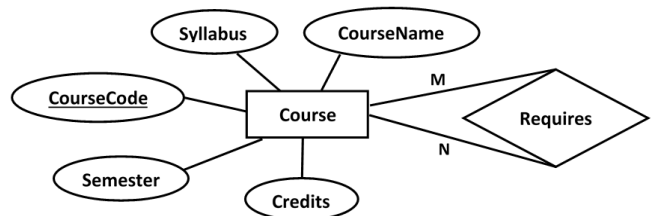
II.



III.



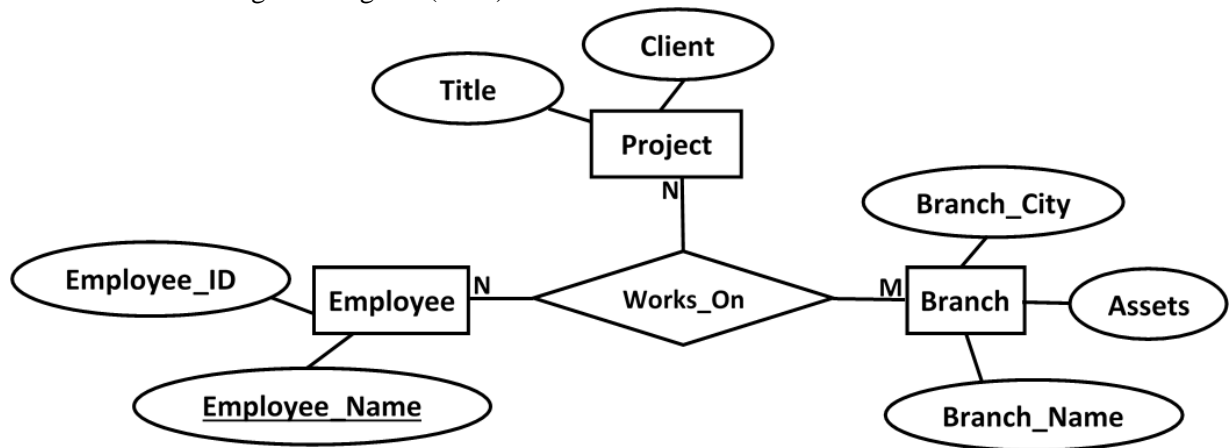
IV.



Which of the above diagrams is/are correctly drawn to produce the given scenario?

- (a) I only
- (b) I and II only
- (c) I and III only
- (d) III and IV only
- (e) II, III and IV only

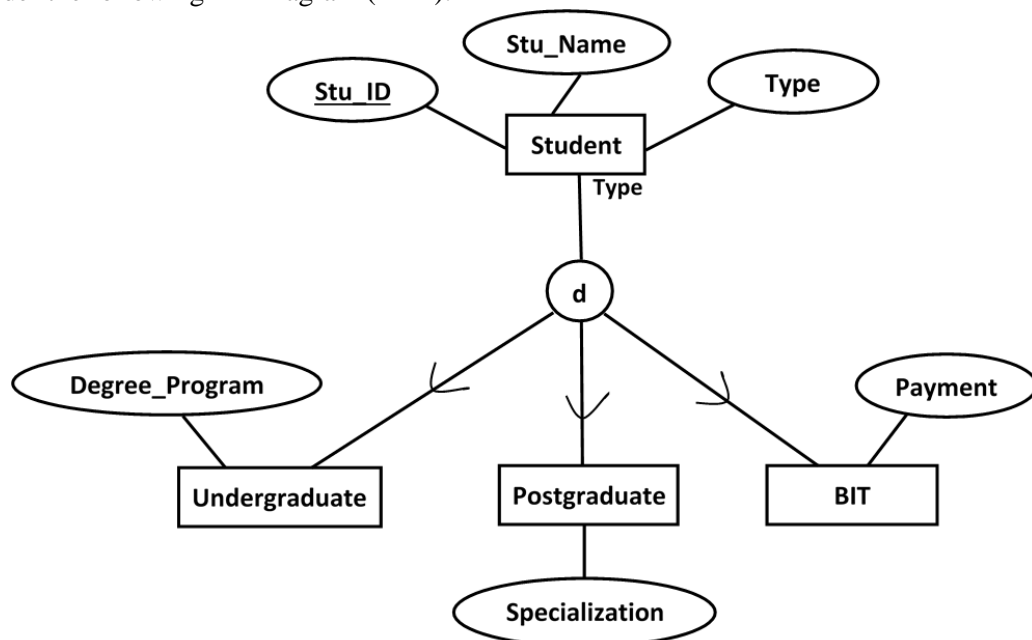
13) Consider the following ER Diagram (ERD).



Which of the following relations is/are possible if the above ERD is mapped into a relational model?

- (a) Branch (Branch Name, Branch_City, Assets)
- (b) Employee (Employee ID, Employee_Name)
- (c) Project (Title, Client)
- (d) Project (Title, Employee ID, Branch Name, Grade)
- (e) Works_On (Employee ID, Branch Name, Title)

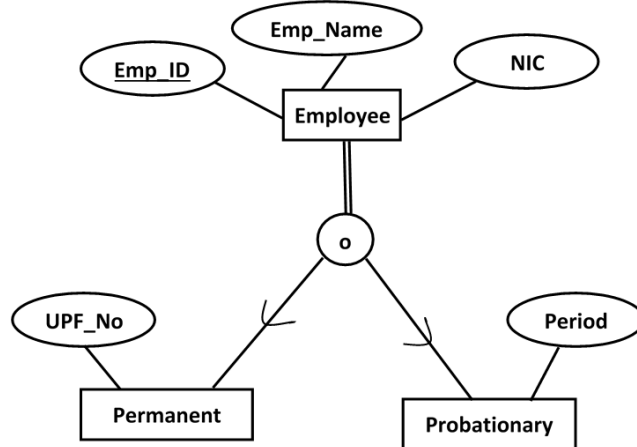
14) Consider the following ER Diagram (ERD).



Which of the following relations is/are possible if the above ERD is mapped into a relational model with the minimum number of relations?

- (a) Student (Stu_ID, Stu_Name, Degree_Program, Specialization, Payment)
- (b) Undergraduate (Stu_ID, Stu_Name, Degree_Program)
- (c) Postgraduate (Stu_ID, Stu_Name, Type)
- (d) BIT (Stu_ID, Type, Payment)
- (e) Student (Stu_ID, Stu_Name, Type, Degree_Program, Specialization, Payment)

Consider the following ER Diagram (ERD) for answering the questions (15) and (16).



- 15) Which of the following statements is/are true based on the above ERD?

- (a) This is a total overlapping specialization relationship.
- (b) Every employee should either be a Permanent employee or a Probationary employee or both.
- (c) A Probationary employee may also be a Permanent employee.
- (d) There can be employees who are neither Permanent nor Probationary.
- (e) A Probationary employee cannot be a Permanent employee.

- 16) Given below are a set of relations identified after mapping the above ERD into a relational model. Which of the following is/are possible relations after mapping?

- (a) Employee (Emp_ID, NIC, Emp_Name)
- (b) Permanent (Emp_ID, UPF_No)
- (c) Probationary (Emp_ID, NIC, Emp_Name, Period)
- (d) Employee (Emp_ID, NIC, Emp_Name, UPF_No, Period)
- (e) Employee (Emp_ID, NIC, Emp_Name, Per_Flag, UPF_No, Pro_Flag, Period)

- 17) Consider the following statements about mapping many-to-many (M:N) binary relationships in an ER Diagram (ERD).

- I. A new relation will be created and primary keys of each participating entity will be copied to the new relation to act as foreign keys.
 - II. Attributes which are parts of the relationship will be added to one of the two entities.
 - III. Primary keys of the entities will be combined to create the primary key in a new relation.
- Which of the above statements is/are correct?

- | | | |
|--------------------|-------------------|--------------|
| (a) I only | (b) II only | (c) III only |
| (d) I and III only | (e) I, II and III | |

- 18) Assume there are r_R and r_S number of tuples and n_R and n_S number of attributes in the relations R and S respectively. If R and S are union compatible, which of the following statements is/are true?

- (a) $(R \cup S)$ contains exactly $(r_R + r_S)$ tuples.
- (b) $(R \times S)$ contains exactly $(r_R * r_S)$ tuples.
- (c) $(R \cap S)$ contains at most $(r_R + r_S)$ tuples.
- (d) $(R - S)$ contains at least r_S tuples.
- (e) $(R - S)$ contains exactly $(r_R - r_S)$ tuples.

Consider the following relational schema which represents a Library domain to answer the following questions from (19) to (21). Primary keys are underlined and foreign keys are in *italic*.

Member (mem_id, mem_name, joined_date, *mem_type*, age, email, address)
 Membership_type (type_id, type_name, max_books)
 Book (b_id, title, author, isbn, *category*)
 Book_Category (cat_id, cat_name)
 Borrows (mem_id, book_id, borrowed_date, returned_date, renew_count)

19) Consider the sequence of operations given below.

Result1 $\leftarrow \sigma_{\text{cat_name} = \text{'Fiction'}} (\text{Book_category})$
 Result2(book_id, title) $\leftarrow \pi_{\text{b_id}, \text{title}} (\text{Book} \bowtie_{\text{category} = \text{cat_id}} (\text{Result1}))$
 Result3(m_id) $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{age} > 18} (\text{Member}))$
 Result4 $\leftarrow \pi_{\text{book_id}} (\text{Borrows} \bowtie_{\text{mem_id} = \text{m_id}} (\text{Result3}))$
 Result5 $\leftarrow \text{Result2} \div \text{Result4}$

What will the above sequence of operations produce?

- (a) Book_ids and titles of 'Fiction' category books which have been borrowed by any member who is above 18 years of age.
- (b) Book_ids and titles of 'Fiction' category books which have been borrowed by any member who is 18 years old.
- (c) Titles of 'Fiction' category books each of which have been borrowed by any member who is below 18 years of age.
- (d) Titles of 'Fiction' books each of which have been borrowed by every member who is above 18 years of age.
- (e) Titles of 'Fiction' category books each of which have been borrowed by every member who is below 18 years old.

20) Which of the following sequence of operations would result in names of all the members of 'Gold' membership type, who have renewed the borrowed books at least once?

- (a) Result1 $\leftarrow \pi_{\text{mem_id}, \text{mem_name}} (\text{Member} \bowtie_{\text{mem_type} = \text{type_id}} (\sigma_{\text{type_name} = \text{'Gold'}} (\text{Membership_type})))$
 Result2 $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{renew_count} > 0} (\text{Borrows}))$
 Result3 $\leftarrow \pi_{\text{mem_name}} (\text{Member} \times \text{Result2})$
- (b) Result1 $\leftarrow \pi_{\text{mem_id}} (\text{Member} \bowtie_{\text{mem_type} = \text{type_id}} (\sigma_{\text{type_name} = \text{'Gold'}} (\text{Membership_type})))$
 Result2(m_id) $\leftarrow \text{Result1} \cup (\pi_{\text{mem_id}} (\sigma_{\text{renew_count} > 0} (\text{Borrows})))$
 Result3 $\leftarrow \pi_{\text{mem_name}} (\text{Member} \bowtie_{\text{mem_id} = \text{m_id}} \text{Result2})$
- (c) Result1 $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{type_name} = \text{'Gold'}} (\text{Member} \times \text{Membership_type}))$
 Result2 $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{renew_count} > 0} (\text{Borrows}))$
 Result3 $\leftarrow \pi_{\text{mem_name}} (\text{Member} \bowtie_{\text{mem_id} = \text{m_id}} \text{Result2})$
- (d) Result1 $\leftarrow \pi_{\text{mem_id}, \text{mem_name}} (\text{Member} \bowtie_{\text{mem_type} = \text{type_id}} (\sigma_{\text{type_name} = \text{'Gold'}} (\text{Membership_type})))$
 Result2 $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{renew_count} > 0} (\text{Borrows}))$
 Result3 $\leftarrow \pi_{\text{mem_name}} (\text{Member} \div \text{Result2})$
- (e) Result1 $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{type_name} = \text{'Gold'}} \text{ AND } \text{type_id} = \text{mem_type} (\text{Member} \times \text{Membership_type}))$
 Result2(m_id) $\leftarrow \pi_{\text{mem_id}} (\sigma_{\text{renew_count} > 0} (\text{Borrows}))$
 Result3 $\leftarrow \pi_{\text{mem_name}} (\text{Result1} \bowtie_{\text{mem_id} = \text{m_id}} \text{Result2})$

21) Consider the SQL query given below.

```
SELECT DISTINCT book_id FROM Borrows B
WHERE EXISTS (SELECT name FROM Member M WHERE age < 18 AND
B.mem_id=M.mem_id);
```

What would be the corresponding sequence of relational algebra operations for the above query?

- (a) $\pi_{\text{book_id}} (\sigma_{\text{age} < 18} (\text{Borrows} * \text{Member}))$
- (b) $\pi_{\text{book_id}} (\text{Borrows} \div (\sigma_{\text{age} < 18} (\text{Member})))$
- (c) $\pi_{\text{book_id}} (\text{Borrows} - \pi_{\text{mem_id}} (\sigma_{\text{age} < 18} (\text{Member})))$
- (d) $\pi_{\text{book_id}} (\sigma_{\text{age} < 18} (\text{rows} \times \text{Member}))$
- (e) $\pi_{\text{book_id}} (\text{Borrows} \cap \pi_{\text{mem_id}} (\sigma_{\text{age} < 18} (\text{Member})))$

Consider the following relation R(A,B) to answer questions (22) and (23).

A	B
4	300
6	240
4	300
2	100
2	350

22) Which of the given answers illustrate the outputs for the following SQL operations I, II, and III respectively?

- I. SELECT AVG(B) FROM R GROUP BY A;
- II. SELECT MIN(B) FROM R;
- III. SELECT DISTINCT B FROM R;

- (a) {(2, 100)}, {240}, {300, 240, 100, 350}
- (b) {225, 300, 240}, {100}, {300, 240, 100, 350}
- (c) {225, 300, 240}, {240}, {300, 240, 100, 350}
- (d) {300, 240, 100}, {100}, {300, 240}
- (e) {100}, {(240, 300)}, {300, 240, 100, 350}

23) Which of the following SQL statements will result in listing A where B is greater than 200 and categorized by A?

- (a) SELECT A FROM R WHERE B < 200 GROUP BY A;
- (b) SELECT A FROM R WHERE B > 200;
- (c) SELECT A FROM R WHERE A > 200 GROUP BY A;
- (d) SELECT A FROM R WHERE B > 200 GROUP BY B;
- (e) SELECT A FROM R WHERE B > 200 GROUP BY A;

24) Consider the following tasks and identify the SQL commands that should be used to accomplish each task.

- I. Add columns to an existing table.
- II. Delete existing records in a table.
- III. Extracts data from a database.
- IV. Sort Results in ascending and descending order.

Which of the following correctly indicate(s) the SQL command sequence required for each of the above tasks?

- (a) Update, Drop, Select, Order by
- (b) Alter, Delete, Select, Order by
- (c) Alter, Delete, Select, Group by
- (d) Alter, Drop, Select, Group by
- (e) Update, Delete, Select, Order by

Consider the following three (3) relations Customer, Salesman, and Orders taken from a company database to answer questions (25) to (29).

Orders relation has ORD_NO as the Primary key and CUSTOMER_ID as the foreign key from the Customer relation and SALESMAN_ID as the foreign key from the Salesman relation

Customer

CUSTOMER_ID	CUST_NAME	CITY	GRADE	SALESMAN_ID
101	Sirimal	Colombo	2	2
102	Nimal	Kandy	4	1
103	Saman	Colombo	5	2
106	Waruni	Galle	2	5
112	Srimali	Kalutara	3	4
114	Sena	Gampaha	1	3
136	Kamal	Kandy	3	1

Salesman

SALESMAN_ID	NAME	CITY	COMMISSION
1	Sarath Silva	Kandy	0.05
2	Kamal Vithange	Colombo	0.1
3	Pradeep Perera	Gampaha	0.06
4	Nimal Fernando	Kalutara	0.07
5	Supun Tisera	Galle	0.08

Orders

ORD_NO	PURCH_AMT	ORD_DATE	CUSTOMER_ID	SALESMAN_ID
1006	1250	2020-09-04	136	1
1020	10000	2020-08-12	114	3
1101	200	2020-09-06	101	2
1102	500	2020-09-01	103	2
1105	100	2020-07-30	112	4
1146	500	2020-09-01	114	3
1202	1000	2020-07-21	102	1
1245	5000	2020-09-06	101	2
1331	2000	2020-07-09	106	5

- 25) Which of the following SQL statements will execute without any error?

- (a) INSERT INTO Orders VALUES (1007, 5000, 2020-09-05, 111, 5);
- (b) INSERT INTO Orders VALUES (1202, 5000, 2020-09-05, 101, 5);
- (c) INSERT INTO Orders VALUES (1007, 5000, 2020-09-05, 101, 6);
- (d) INSERT INTO Orders VALUES (1007, 5000, 2020-09-05, 101, 5);
- (e) INSERT INTO Orders VALUES (NULL, 5000, 2020-09-05, 101, 5);

- 26) Assume that you want to retrieve the names of the customers who have purchased more than 5000 items. Which of the following statements will produce the correct result?

- I. SELECT c.CUST_NAME, s.NAME, o.PURCH_AMT FROM Customer c, Salesman s, Orders o WHERE o.PURCH_AMT > 5000;
- II. SELECT CUST_NAME FROM Customer c LEFT OUTER JOIN Orders o ON (c.CUSTOMER_ID = o.CUSTOMER_ID) WHERE o.PURCH_AMT > 5000;
- III. SELECT CUST_NAME FROM Customer c LEFT OUTER JOIN Orders o ON (c.CUSTOMER_ID = o.CUSTOMER_ID);

- (a) I only
- (b) I and II only
- (c) I and III only
- (d) II only
- (e) II and III only

- 27) Which of the following statements will produce a list with salesman name, customer name and their cities for the salesmen and customers who belong to the same city?
- | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) SELECT salesman.name AS "Salesman", customer.cust_name, customer.city FROM salesman,customer WHERE salesman.city=customer.city;
(b) SELECT salesman.name AS "Salesman", customer.cust_name, customer.city FROM salesman WHERE salesman.city=customer.city;
(c) SELECT salesman.name AS "Salesman", customer.city FROM salesman,customer WHERE salesman.city=customer.city;
(d) SELECT name AS "Salesman", cust_name, customer.city FROM salesman,customer WHERE salesman.city=customer.city;
(e) SELECT name AS "Salesman", cust_name, city FROM salesman,customer WHERE salesman.city=customer.city |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- 28) Consider the following SQL statement.
`DELETE FROM customer WHERE CUSTOMER_ID = 101;`
 The execution of the above SQL statement will
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| (a) delete the customer with ID 101
(c) delete all the records from the customer table
(e) delete the customer with ID 101 and result in an error | (b) delete the customer named Sirimal
(d) result in an error |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
- 29) Assume that the management of a company decided to increase the commission for each salesperson by 5% of their current commission.
 Which of the following statements will list the name of the salesperson and the NEW_COMMISSION for each salesperson in descending order?
- | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) SELECT name, commission + commission * 0.5 AS NEW_COMMISSION FROM salesman ORDER BY DESC;
(b) SELECT name, commission + commission * 0.5 AS NEW_COMMISSION FROM salesman ORDER BY NEW_COMMISSION DESC;
(c) SELECT name, commission * 0.5 AS NEW_COMMISSION FROM salesman ORDER BY NEW_COMMISSION DESC
(d) SELECT name, commission * 0.5 AS NEW_COMMISSION FROM salesman ORDER BY DESC;
(e) SELECT commission + commission * 0.5 AS NEW_COMMISSION FROM salesman ORDER BY NEW_COMMISSION DESC; |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- 30) Which of the following is **not** a Data Definition Language (DDL) command?
- | | | |
|-------------------------|------------------------|------------|
| (a) RENAME
(d) GRANT | (b) REVOKE
(e) DROP | (c) UPDATE |
|-------------------------|------------------------|------------|
- 31) Which of the following keywords is/are used with Data Control Language statements?
- | | |
|----------------------------------------|-------------------------|
| (a) SELECT
(c) DELETE
(e) UPDATE | (b) REVOKE
(d) GRANT |
|----------------------------------------|-------------------------|
- 32) A View in a Database Management System is a:
- | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) base table, which occupies a particular amount of storage space.
(b) way of automatically achieving a high degree of access control to a database.
(c) way of keeping the accuracy and consistency of data values in the database.
(d) way of viewing a system from the perspective of the functions it should perform.
(e) useful way of limiting a user's access to various portions of the database. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

33) Consider the two base tables given below.

Department (Dept_Id, Dep_Name, Dept_Head)

Employee (Emp_ID, Emp_Name, Designation, DoB, Dept)

Which of the following SQL statements create(s) a view to see the number of employees working in each department?

- (a) CREATE VIEW Dept_Employees(Dept_Id, No_of_Employees) AS SELECT Dept,Count(*) FROM Employee GROUP BY Dept;
- (b) CREATE VIEW Dept_Employees(Dept_Id, No_of_Employees) AS SELECT Dept,Count(Dept_Id) FROM Employee GROUP BY Dept;
- (c) CREATE VIEW Dept_Employees(Dept_Id, No_of_Employees) AS SELECT Dept,Count(*) FROM Employee GROUP BY Emp_ID;
- (d) CREATE VIEW Dept_Employees(Dept_Id, No_of_Employees) AS SELECT Dept,Count(DISTINCT Emp_ID) FROM Employee GROUP BY Dept;
- (e) CREATE VIEW Dept_Employees(Dept_Id, No_of_Employees) AS SELECT Dept,Count(Emp_ID) FROM Employee GROUP BY Dept;

34) The view **Fund_Summary** can be used to display the EmpNo, Name, Salary and the number of research funds (No_of_Funds) of the department heads who control more than two research fund.

```
CREATE VIEW Fund_Summary (EmpNo, Name, Salary, No_of_Funds) AS
SELECT L.EmpNo, L.Name, L.Salary, COUNT(*)
FROM Lecturer L, Department D, Research_Fund R
WHERE L.EmpNo = D.HeadEmpNo AND L.EmpNo = R.EmpNo
GROUP BY L.EmpNo, L.Name, L.Salary
HAVING COUNT(*) >2 ;
```

You are given following list of SQL statements to execute on the **Fund_Summary** view.

- I. SELECT COUNT(No_of_Funds) FROM Head_Funds;
- II. SELECT * FROM Head_Funds WHERE COUNT(No_of_Funds) >2;
- III. CREATE VIEW Head_Fund1 AS SELECT EmpNo, Salary, No_of_Funds FROM Head_Funds WHERE Salary between 50000 and 100000;

Which of the following statements is/are true?

- (a) Only (I) can be executed on **Fund_Summary** view.
- (b) Only (II) can be executed on **Fund_Summary** view.
- (c) Only (III) can be executed on **Fund_Summary** view.
- (d) Only (I) & (II) can be executed on **Fund_Summary** view.
- (e) Only (II) & (III) can be executed on **Fund_Summary** view.

35) Consider the SQL statement given below.

```
GRANT SELECT, UPDATE(address)
ON Student_details
TO Silva;
```

Which of the following statements is/are correct about the above SQL?

- (a) Grant permission to Silva to update address in the Student_details table.
- (b) Grant permission to Silva to retrieve data in the Student_details table.
- (c) Silva is given the right to grant select and update privileges to the other users.
- (d) Silva is given permission only to change the Student_details table.
- (e) Silva has the rights to change and retrieve the data from the Student_details table.

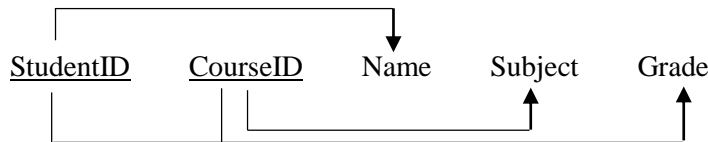
36) Which of the following concepts is/are applicable to 2NF?

- (a) Data independence
- (b) Full functional dependency
- (c) Partial dependency
- (d) Transitive dependency
- (e) Non-transitive dependency

- 37) Database security and authorization subsystems use Discretionary security mechanism. Which of the following statements is/are true on Discretionary security mechanism?

- (a) Granting and revoking privileges are the usual methods of enforcing a Discretionary security mechanism.
 (b) A Discretionary security mechanism is a collection of decision support technologies, aimed at enabling the knowledge worker to make better and faster decisions.
 (c) Discretionary security mechanisms have two levels for assigning privileges to use the database system as account level and relational level.
 (d) Discretionary security mechanism govern the access to the information by the individuals on the basis of the classification of subjects and objects in the system.
 (e) Discretionary security mechanism governs the access of users to the information using a set of predefined discretionary rules and user's identity.

- 38) Consider the following functional dependency diagram on student grades for courses.



Which of the following **best describes** its normal form when all the above data is put into a single relation?

- (a) The relation is in 0NF (b) The relation is in 1NF (c) The relation is in 2NF
 (d) The relation is in 3NF (e) The relation is in BCNF

- 39) Consider the relation *Interview* (*CandidateNo*, *InterviewDate*, *InterviewTime*, *StaffNo*, *RoomNo*) and the following functional dependencies.

FD1 : *CandidateNo*, *InterviewDate* → *InterviewTime*, *StaffNo*, *RoomNo*

FD2 : *RoomNo*, *InterviewDate*, *InterviewTime* → *StaffNo*, *CandidateNo*

FD3 : *StaffNo*, *InterviewDate* → *RoomNo*

Which of the following is/are correct?

- (a) The relation Interview is in 3NF. (b) The relation Interview is in BCNF.
 (c) The FD3 violates BCNF. (d) The FD3 violates 3NF.
 (e) The FD2 violates 2NF.

- 40) Consider the following sample data in the relation ITEM-SUPPLIER.

ItemNo	Description	VendorName	VendorAddress	UnitPrice
001	Wireless Mouse	PC House	No. 12,Colombo 05.	19,500.00
		My Shop	No. 4/A,Colombo 03.	18,000.00
002	SSD	PC House	No. 12,Colombo 05.	16,500.00
		Green PC	No. 2,Colombo 07.	17,000.00
		My Shop	No. 4/A,Colombo 03.	16,000.00
003	SanDisk Ultra USB	Green PC	No. 2,Colombo 07.	7,550.00

Which of the following statements is/are true with respect to the relation ITEM-SUPPLIER?

- (a) The relation ITEM-SUPPLIER is in unnormalised form.
 (b) The relation ITEM-SUPPLIER is in first normal form.
 (c) Insertion of a new item does not require the insertion of the related vendor details.
 (d) Only the VendorName and VendorAddress are multi-valued attributes in relation ITEM-SUPPLIER.
 (e) ItemNo is the key of the relation ITEM-SUPPLIER
