



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2021 – 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 **11 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 **incorrect** regarding End-users and practitioners of a Database?
- (a) Database administrators tune the DBMS for best performance

(b) Database administrators choose appropriate structures to represent and store data

(c) Parametric end users have deep knowledge of database design and DBMS facilities

(d) System analysts determine the requirements of end users

(e) Database administrators coordinate and monitor the use of databases
- 2) Which of the following statements is/are **true** regarding database languages?
- (a) DDL allows the user to describe any associated integrity and security constraints.

(b) DML provides basic insert, delete, and update operations on data held in the database.

(c) Procedural DML allows users to state what data is needed rather than how it is to be retrieved.

(d) Non-Procedural DML allows users to tell the system exactly how to manipulate data.

(e) DML allows the user to describe and name entities, attributes, and relationships required for the application.
- 3) Logical and physical data independence are two important concepts used to ensure data independence in Database Management Systems. Which of the following is/are **true** regarding these two concepts?
- (a) Physical data independence refers to the ability to change the conceptual schema without changing external schemas.

(b) Logical data independence refers to immunity of conceptual schema to changes in the internal schema.

(c) Physical data independence ensures that changes in storage space allocation for data and indexes will not affect any internal schemas.

(d) Logical data independence ensures that changes in entities, attributes and their relationships will not affect external schemas.

(e) Physical data independence does not require changes to conceptual or external schemas.
- 4) Which of the following statements is/are **true** regarding ANSI/SPARC Architecture?
- I) The conceptual level describes how the data is stored in the database.
- II) The external level shows how the different user's data is stored in the database.
- III) The internal level describes how the data is stored in the database.
- (a) I only (b) II only (c) III only

(d) I & II only (e) I & III only
- 5) Which of the following statements is/are **correct** with respect to the concept of keys in a relational data model?
- (a) A composite key can be a primary key.

(b) Every candidate key is a super key to the relation

(c) A super key of a relation should be unique and minimal

(d) A super key with more than one attribute is not a key of the relation

(e) The candidate key which is selected as the primary key is called a super key

6) Consider the given LECTURE_PLAN relation.

course_code	lecturer	weeks	day_of_week	time	lecture_hall
IT1101	Ali	15	SATURDAY	8:00 AM	Auditorium 2
IT2001	Kumar	15	SUNDAY	8:00 AM	Auditorium 1
IT2203	Gamage	10	MONDAY	5:00 PM	Lab A
IT3201	Fernando	15	SATURDAY	1:00 PM	Lab C
IT3305	Wijeratna	12	SUNDAY	1:00 PM	Auditorium 1

Which of the following options correctly states the values of I - III?

I - The degree of the relation

II - The cardinality of the relation

III - The domain cardinality of the 'day_of_week' attribute

- | | | |
|----------------------------|----------------------------|----------------------------|
| (a) I - 5, II - 6, III - 3 | (b) I - 5, II - 6, III - 7 | (c) I - 6, II - 5, III - 3 |
| (d) I - 6, II - 5, III - 7 | (e) I - 6, II - 6, III - 7 | |

7) If the foreign key FK of the relation S refers to the relation R, which of the following statements is/are **correct** about this referential relationship?

- | |
|--|
| (a) The FK can be a part of the relation R |
| (b) The value of FK cannot be null in any of the tuples |
| (c) The primary key of relation R should not be a composite key |
| (d) The FK and the primary key of R must have the same domain |
| (e) The FK must contain only one of the attributes in the relation S |

8) Consider the CUSTOMER relation given below and the statements I-IV about the relation.

<u>customer_id</u>	name	Ni	contact_no	address	age
		c			

- I. Every customer is uniquely identified by the nic (national id card number).
- II. The customer_id is the primary key field of the relation.
- III. Every customer must be 18 years or older.
- IV. Every customer must have a name.

Which of the following relational model constraint(s) correctly reflect(s) the requirements of the CUSTOMER relation?

- | |
|--|
| (a) NULL constraint on nic |
| (b) Domain constraint on age |
| (c) Uniqueness constraint on name |
| (d) Entity integrity constraints on name |
| (e) Entity integrity constraint on customer_id |

9) Which of the following statements is/are **correct** about the database design process?

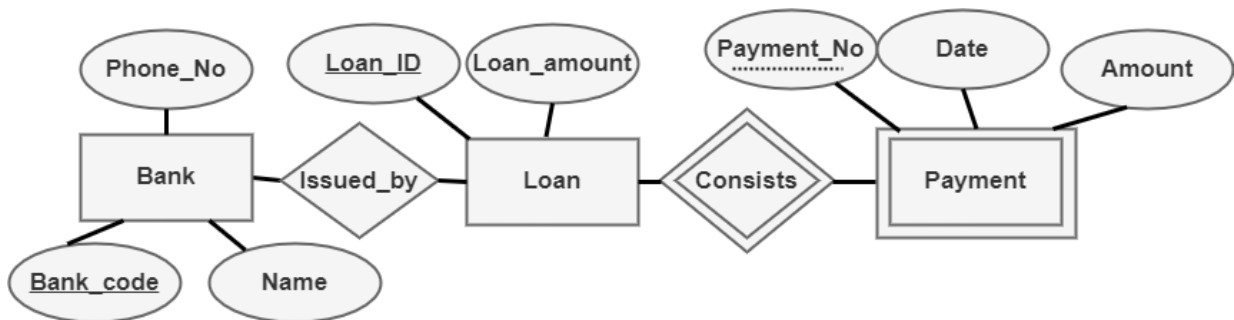
- | |
|---|
| (a) In the requirements collection and analysis step, the database designers document prospective database user's data requirements |
| (b) In the conceptual schema, detailed descriptions of the entity types, relationships, and constraints are expressed using the concepts provided by the high-level data model. |
| (c) The logical design depends on the particular database management system. |
| (d) The logical design phase, file organizations, access paths for the database files are specified. |
| (e) The physical design process depends on the particular database management system. |

- 10) Listed in Column A are different types of attributes and in Column B are descriptions associated with a certain type. Correctly match the description to the most appropriate attribute type.

Column A		Column B	
I	Composite Attribute	A	An attribute that cannot be broken down into smaller components
II	Atomic Attribute	B	An attribute that can be broken down into component parts
III	Multivalued Attribute	C	An attribute whose values can be calculated from related attribute values
IV	Derived Attribute	D	An attribute that may take on more than one value for a given entity instance

- | | |
|------------------------------------|------------------------------------|
| (a) I – B, II – A, III – C, IV – D | (b) I – B, II – D, III – A, IV – C |
| (c) I – B, II – D, III – C, IV – A | (d) I – B, II – A, III – D, IV – C |
| (e) I – B, II – C, III – A, IV – D | |

- 11) Consider the following incomplete ER-diagram regarding a bank database. Which of the following statements is/are **true**?



- | |
|--|
| (a) Payment_No is the primary key of the Payment entity. |
| (b) Loan entity and Bank entity can be identified as owner entities for the Payment entity. |
| (c) The primary key of Payment entity is a combination of Bank_code , Loan_ID and Payment_No |
| (d) The primary key of Payment entity is a combination of Loan_ID and Payment_No |
| (e) The Loan entity can be identified as the owner entity of Payment entity. |

- 12) The management of ABC hospital is considering implementing a database to enhance their day to day operations. Some of their employee types include doctors, nurses, administrators and office workers. Office workers can work as an administrator. From those employees, one will monitor the whole operation of the hospital.

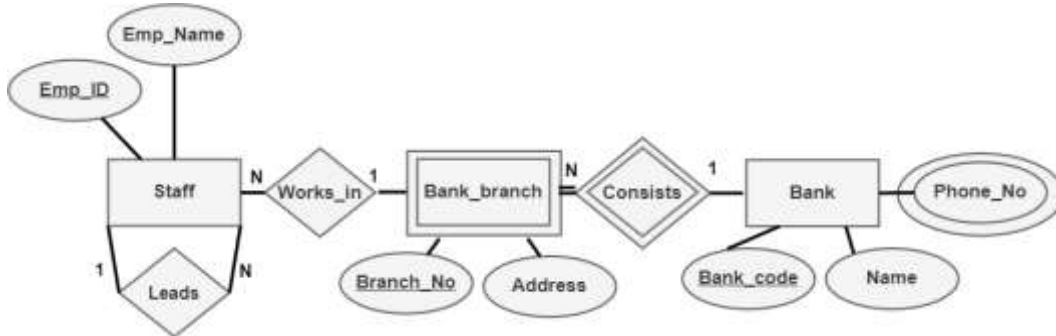
Imagine you are the database designer of the organization and you need to create an ER-diagram for the above scenario. Which of the following statements is/are **true** regarding the database components?

- | |
|--|
| (a) There needs to be a disjointness constraint to specify employee types as doctors, nurses and office workers entities. |
| (b) The overlapping constraint can be used to demonstrate the doctors, nurses, administrators and office workers entities in the organization. |
| (c) There is a total specialization constraint in the database design. |
| (d) There is a partial specialization constraint in the database design. |
| (e) There is a ternary relationship within the employee entity. |

- 13) Which of the following statements is/are **true** about Constraints on Generalization and Specialization?
- I. User-defined subclass defines membership by a specific condition using the same relationship.
 - II. Attribute-defined specialization specifies the membership condition for subclasses using the same attribute of the super class.
 - III. Predicate defined subclasses determine exactly those entities that will become members of each subclass by a condition.

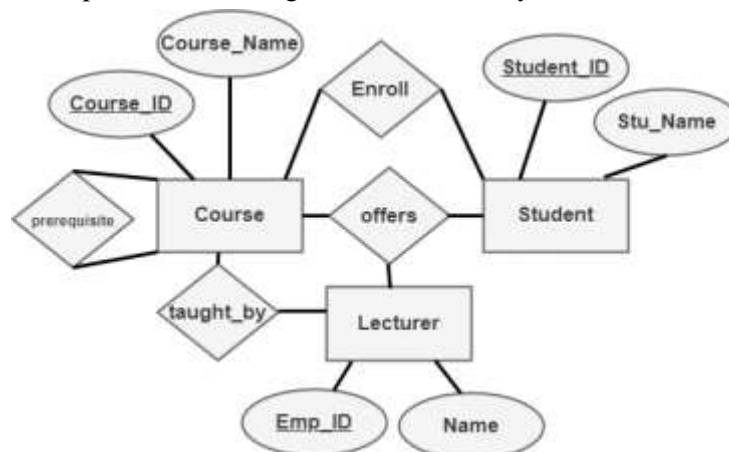
- | | | |
|-----------------|-------------------|--------------|
| (a) I only | (b) II only | (c) III only |
| (d) I & II only | (e) II & III only | |

- 14) Consider the incomplete ER diagram given below and select **correct** relation(s) if it is mapped into a relational model.



- | |
|--|
| (a) Staff(<u>Emp_ID</u> , Emp_Name, LeaderID)
(b) Bank_branch(<u>Bank_Code</u> , Branch_No, Address)
(c) Bank(<u>Bank_Code</u> , Name, Phone_No)
(d) Bank_phone(Bank_code, Phone_No)
(e) Bank_branch(Bank_Code, Emp_ID, Branch_No, Address) |
|--|

- 15) The figure below shows part of an ER-diagram for a university database.



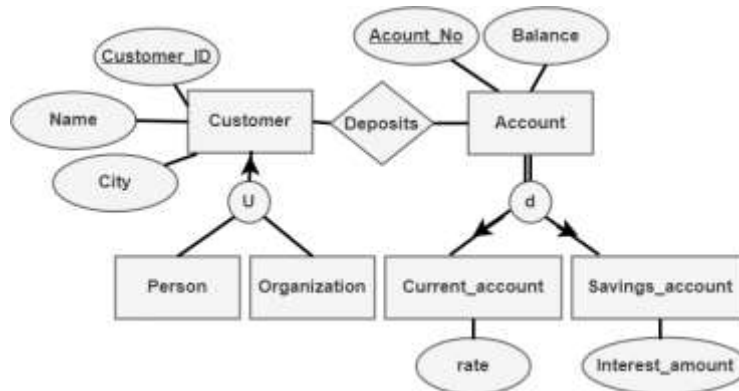
Which of the following statements is/are **correct** regarding the above ER-diagram?

- | |
|---|
| (a) Courses may be prerequisites for other courses and is represented a unary relationship.
(b) There is a total number of three binary relationships in this diagram.
(c) Lecturers offering certain courses to students is shown as a ternary relationship.
(d) The primary key for the <i>offers</i> relationship only includes <i>Student_ID</i> and <i>Course_ID</i> as Foreign Keys.
(e) When mapping the prerequisite relationship into the relational data model, the Primary Key of the relationship includes <i>Course_ID</i> as Foreign Key twice. |
|---|

16) Which of the following statements **best** describe(s) the cardinality of a relationship?

- (a) The cardinality specifies the maximum number of relationship instances in which an entity can participate.
- (b) The cardinality specifies the number of participating entity types.
- (c) The cardinality specifies the property or characteristic of an entity type that is of interest to the organization.
- (d) The possible cardinality ratios for binary relationship types are 1:1, 1:N, N:1, and M:N.
- (e) Maximum Cardinality is the maximum number of instances of one entity that may be associated with a single occurrence of another entity.

17) Which of the following statements **best** describe(s) the information presented in the EER diagram below?



- (a) **Account** entity can be either a current account or a savings account.
- (b) **Account** entity can be a current account and a savings account at the same time.
- (c) Every **Account** entity must be at least a current account or a savings account.
- (d) Every **Customer** entity must be at least a person or an organization.
- (e) The **Customer** entity is a subclass with more than one superclass.

18) Which of the following operations always produces a relation with the same number of attributes as the operand relations?

- | | | |
|----------------|--------------------|--------------|
| (a) Join | (b) Union | (c) Division |
| (d) Projection | (e) Set difference | |

Consider the given relational algebra expressions and answer the questions 19 - 21.

$R1 \leftarrow \pi_{\text{student_id, grade}} (\sigma_{\text{course_code}='IT2306'} (\text{MARK}))$

$R2 \leftarrow \pi_{\text{s_id}} (\sigma_{\text{gpa} \geq 2} (\text{STUDENT}))$

19) Which of the following options states valid relational algebra operations?

- | | | |
|------------------|------------------|--------------------|
| (a) $R1 - R2$ | (b) $R2 \cap R1$ | (c) $R1 \times R2$ |
| (d) $R1 \div R2$ | (e) $R2 \div R1$ | |

20) Which of the following expressions generate(s) the same result as $\pi_{\text{grade}} (R1 \bowtie_{\text{student_id}=\text{s_id}} R2)$?

- | | | |
|--|---|--|
| (a) $R2 \div (\rho_{\text{s_id}} R1)$ | (b) $R1 \div (\rho_{\text{student_id}} R2)$ | (c) $\pi_{\text{grade}} (R1 \bowtie_{\text{student_id}=\text{s_id}} R2)$ |
| (d) $\pi_{\text{grade}} (\sigma_{\text{s_id}=\text{student_id}} (R1 \times R2))$ | (e) $\pi_{\text{student_id, grade}} (R1 * (\rho_{\text{student_id}} R2))$ | |

- 21) Which of the following statements correctly describe(s) the output produced by the following expression?

$$R1 \div ((\pi_{\text{student_id}} R1) - (\rho_{(\text{student_id})} R2))$$

- (a) The grades in IT2306 of students with a GPA < 2.
- (b) The grades in IT2306 of students with a GPA ≥ 2.
- (c) The grades in all the courses except IT2306, of students with a GPA < 2.
- (d) The value of the grade in IT2306 divided by the GPA value of all the students with a GPA < 2.
- (e) The value of the mark in IT2306 divided by the GPA value of all the students with a GPA ≥ 2.

- 22) Which of the following statements is/are correct?

SQL language is a,

- (a) database programming language
- (b) database administration language
- (c) client/server language
- (d) complete programming language
- (e) distributed database language

- 23) Which of the following key words is/are used to specify integrity constraints?

- (a) CREATE INDEX
- (b) UNIQUE
- (c) CHECK
- (d) FOREIGN KEY
- (e) DROP TABLE

- 24) Match the description listed in Column A with the appropriate SQL functions listed in Column B.

	Column A		Column B
I	Define a portion of a database that a particular user owns	A	CREATE INDEX
II	Defines logical table from one or more tables or views.	B	CREATE DATABASE
III	Defines the location of the database (distributed systems)	C	CREATE TABLE
IV	Initial allocation of storage space to contain database objects	D	CREATE LOCATION
V	Defines an index that enables rapid access	E	CREATE VIEW
		F	CREATE SCHEMA

- (a) I-F, II-E, III-B, IV-D, V-A
- (b) I-E, II-A, III-F, IV-C, V-B
- (c) I-D, II-F, III-C, IV-B, V-E
- (d) I-F, II-E, III-D, IV-B, V-A
- (e) I-C, II-D, III-E, IV-F, V-A

- 25) Which of the following statements is/are **correct** regarding Views in SQL?

- (a) A view can be derived only from base tables, not from previously defined views.
- (b) A view exists in physical form same as base tables whose tuples are always physically stored in the database.
- (c) Views does not provide any limitations on querying, but limits the possible update operations.
- (d) Integrity constraints and triggers can be defined explicitly for views.
- (e) The view is given a name, a list of attribute names, and a query to specify the contents of the view.

26)

Which of the following statements is/are **correct** regarding the commonly accepted security goals?

- (a) Database integrity is lost if unauthorized changes are made to the data by either intentional or accidental acts.
- (b) Database availability refers to making all data objects available to both authentic and unauthentic users.
- (c) Database availability refers to protecting data from unauthorized disclosure.
- (d) Database confidentiality refers to the protection of data from unauthorized disclosure.
- (e) Loss of availability occurs when unauthorized changes are made to the data by either intentional or accidental acts.

Consider the following four relations **EMPLOYEE**, **DEPARTMENT**, **DEPENDENT**, and **JOB** taken from a company database to answer questions (27) to (32).

The **EMPLOYEE** relation has **emp_id** as the Primary key and **dept_id** as the foreign key from the **DEPARTMENT** relation and **job_id** as the foreign key from the **JOB** relation.

The **DEPENDENT** relation has **depend_id** as the Primary key and **emp_id** as the foreign key from the **EMPLOYEE** relation (Cascade on delete/update).

EMPLOYEE

emp_id	f_name	l_name	job_id	salary	dept_id
100	Sarath	Perera	4	24,000.00	9
101	Neela	Dias	5	15,000.00	1
102	Lalith	De Silva	1	17,000.00	2
103	Asela	Herath	3	17,000.00	6
104	Aravinda	Lekamge	2	10,000.00	2
105	Damith	Perera	3	22,000.00	6

DEPARTMENT

dept_id	dept_name	location
1	Administration	F001
2	Marketing	F002
3	Human Resources	T005
6	IT	T003
9	Executive	S001

DEPENDENT

depend_id	f_name	l_name	relationship	emp_id
1	Piyumi	De Silva	Child	102
2	Jayani	Perera	Child	100
3	Primal	Dias	Child	101
4	Binura	De Silva	Child	102
5	Gayan	Lekamge	Child	104

JOB

job_id	job_title	min_salary	max_salary
1	Finance Manager	10,000.00	20,000.00
2	Marketing Manager	10,000.00	25,000.00
3	Programmer	15,000.00	25,000.00
4	President	30,000.00	40,000.00
5	Accountant	8,000.00	15,000.00

27)

Which of the following statements will execute without any error?

- (a) INSERT INTO DEPENDENT VALUES (3, 'Ama', 'Perera', 'Child', 105);
- (b) INSERT INTO DEPENDENT VALUES (6, 'Ama', 'Perera', 'Child', 105);
- (c) INSERT INTO DEPENDENT VALUES (6, 'Ama', 'Perera', 'Child', 106);
- (d) INSERT INTO DEPENDENT VALUES (6, 'Ama', 'Perera', 'Sibling', 105);
- (e) INSERT INTO DEPENDENT VALUES (6, 'Ama', 'Perera', 'Child', 104);

- 28) Which of the following statements will give a list of employees who works at the IT department with a salary more than 20,000.00?

(a) SELECT e.f_name, e.l_name from EMPLOYEE e, DEPARTMENT d WHERE e.dept_id in (SELECT d.dept_id from DEPARTMENT WHERE d.dept_name = 'IT');
(b) SELECT f_name, l_name from EMPLOYEE WHERE dept_id in (SELECT dept_id from DEPARTMENT WHERE dept_name = 'IT') AND salary >= 20,000.00;
(c) SELECT e.f_name, e.l_name from EMPLOYEE e, DEPARTMENT d WHERE e.dept_id in (SELECT d.dept_id from DEPARTMENT WHERE d.dept_name = 'IT') AND salary >= 20,000.00;
(d) SELECT e.f_name, e.l_name from EMPLOYEE e, DEPARTMENT d WHERE e.salary >= 20,000.00 AND d.dept_id in (SELECT e.dept_id from DEPARTMENT WHERE d.dept_name = 'IT');
(e) SELECT f_name, l_name from EMPLOYEE WHERE salary >= 20,000.00;

- 29) Consider the following SQL statement.

DELETE FROM EMPLOYEE WHERE emp_id = 101;

Which of the following outputs is/are **true** when it is executed?

(a) delete the employee with ID 101 from the EMPLOYEE table
(b) delete the employee named Neela from the EMPLOYEE table
(c) delete all the records from the EMPLOYEE table
(d) result in an error
(e) delete the dependent named Primal from the DEPENDENT table

- 30) Assume that the management of the company decided to increase the salary of each employee by 3% of their current salary.

Which of the following statements will list the f_name of the employee and the NEW_SALARY for each employee in the marketing department in ascending order?

(a) SELECT f_name, salary + salary * 0.03 AS NEW_SALARY FROM EMPLOYEE ORDER BY NEW_SALARY ASC;
(b) SELECT f_name, salary + salary * 0.03 AS NEW_SALARY FROM EMPLOYEE WHERE dept_id = 2 ORDER BY NEW_SALARY;
(c) SELECT f_name, salary + salary * 0.03 AS NEW_SALARY FROM EMPLOYEE WHERE dept_id = 2 ORDER BY NEW_SALARY DESC;
(d) SELECT f_name, salary + salary * 0.03 AS NEW_SALARY FROM EMPLOYEE WHERE dept_id = 2 ORDER BY NEW_SALARY ASC;
(e) SELECT f_name, salary + salary * 0.03 AS NEW_SALARY FROM EMPLOYEE WHERE dept_id = 2;

- 31) Consider the following SQL query:

SELECT DISTINCT e.f_name, e.l_name FROM EMPLOYEE e, DEPENDENT d WHERE e.emp_id IN (SELECT d.emp_id FROM DEPENDENT WHERE d.l_name = 'De Silva')

Which of the following lists the correct output when the above query is executed?

(a) Piyumi De Silva, Binura De Silva, Lalith De Silva
(b) Piyumi De Silva, Binura De Silva
(c) Piyumi De Silva, Lalith De Silva
(d) Lalith De Silva
(e) Lalith De Silva, Binura De Silva

32) Which of the following is/are correct regarding the given SQL statement?

INSERT INTO EMPLOYEE VALUES (106, 'Anura', 'Lekamge', 6, 22000.00, 3);

- (a) It will execute without an error and add one row to the EMPLOYEE table.
- (b) It will give an error and add one row to the EMPLOYEE table.
- (c) It will give an error because emp_id 106 is already in the EMPLOYEE table.
- (d) It will give an error because job_id 6 is not in the JOB table.
- (e) IT will give an error because dept_id 3 is not in the DEPARTMENT table.

33) Which of the following statements is/are **correct** regarding access control in DBMS?

- (a) The two main approaches to access control are Discretionary and Mandatory Access Control.
- (b) Grant and Revoke are the typical method of enforcing Mandatory Access Control.
- (c) Typical security classes in Mandatory Access Control are top secret (TS), secret (S), confidential (C) and unclassified (U).
- (d) Mandatory Access Control would typically be combined with the Discretionary Access Control mechanisms.
- (e) Mandatory Access Control governs the access of users to information on the basis of user's identity and predefined rules.

34) Which of the following statements is/are **true** with regards to the following CREATE VIEW statement?

*CREATE VIEW Employee_payments AS
SELECT Emp_no, Dept_name, Emp_name, Basic_salary, Allowances
FROM Employee_personal, Department
WHERE Dept_no=Dept_number;*

- (a) Employee_payments is a base table.
- (b) Employee_payments is a virtual table.
- (c) Employee_personal and Department required to be virtual tables.
- (d) Employee_personal and Department might to be base tables or virtual tables.
- (e) Employee_personal and Department required to be base tables.

35) Which of the following SQL statements create(s) the view *TotalBalance* to see the total balance maintained by each customer?

*ACCOUNT (Account_Id, Avail_Balance, Cust_Id, Open_Branch_Id, Account_Type)
CUSTOMER (Customer_Id, Name, Address, DOB)*

Assumption: Once customer may create multiple accounts using different account types.

- (a) *SELECT Cust_Id, Name, SUM(Avail_Balance) AS TotalBalance FROM ACCOUNT, CUSTOMER WHERE Cust_Id= Customer_Id GROUP BY Cust_Id HAVING SUM(Avail_Balance) >0;*
- (b) *SELECT Cust_Id, Name, SUM(Avail_Balance) AS TotalBalance FROM ACCOUNT, CUSTOMER WHERE Cust_Id=Customer_Id GROUP BY Cust_Id;*
- (c) *SELECT Cust_Id, Name, SUM(Avail_Balance) AS TotalBalance FROM ACCOUNT, CUSTOMER WHERE Cust_Id= Customer_Id GROUP BY Account_Id;*
- (d) *SELECT Cust_Id, Name, Avail_Balance AS TotalBalance FROM ACCOUNT, CUSTOMER WHERE Cust_Id= Customer_Id GROUP BY Cust_Id;*
- (e) *SELECT Cust_Id, Name, SUM(Avail_Balance) AS TotalBalance FROM ACCOUNT AND CUSTOMER WHERE ACCOUNT.Cust_Id= CUSTOMER.Customer_Id GROUP BY Cust_Id;*

- 36) The following SQL statement creates a view called 'Head_Funds' to display the Employee Number, Name and the Total research funds 'TBudget' of the department heads.

```
CREATE VIEW Head_Funds AS
SELECT D.HeadEmpNo, L.Name, SUM(Budget) AS TBudget
FROM Research_Fund R, Lecturer L, Department D
WHERE D.HeadEmpNo = R.EmpNo AND D.HeadEmpNo = L.EmpNo
GROUP BY HeadEmpNo, Name;
```

You will be given the following SQL statements to execute on the 'Head_Funds' view created above.

- I. SELECT * FROM Head_Funds WHERE Name = Silva;
- II. INSERT INTO Head_Funds VALUES (1,'Fernando',50000);
- III. CREATE VIEW Head_Fund1 AS SELECT HeadEmpNo, Name, TBudget
FROM Head_Funds WHERE TBudget >30000;

Which of the following statements is/are **true**?

- (a) Only (I) can be executed on Head_Funds view.
(b) Only (II) can be executed on Head_Funds view.
(c) Only (III) can be executed on Head_Funds view
(d) Only (I) and (II) can be executed on Head_Funds view
(e) Only (II) and (III) can be executed on Head_Funds view

Consider the below given semantic rules with regards to the MARKET (product, shop, building) relation to answer Questions 37 and 38.

Rule 1 - Each product may sell in several shops and each shop may have several products.

Rule 2 - Each shop is available only in one building and each building may have several shops.

- 37) What is the candidate key of the MARKET relation?

- (a) shop
(b) building
(c) shop, building
(d) product, building
(e) product, shop

- 38) Which of the following functional dependencies exist in MARKET relation based on the above given rules?

- (a) shop \rightarrow product
(b) shop \rightarrow building
(c) building, product \rightarrow shop
(d) building \rightarrow product
(e) shop, product \rightarrow building

39) Consider the given functional dependencies on the following relational schema.

$Emp_No \rightarrow \{Emp_name, Bdate, Address, Dept_No\}$
 $Dept_No \rightarrow \{Dept_name, Mgr_No\}$

Which of the additional functional dependencies can be inferred from the above functional dependencies?

- (a) $Emp_No \rightarrow \{Dept_name, Mgr_No\}$
- (b) $Emp_name \rightarrow Dept_No$
- (c) $Emp_Name \rightarrow Dept_name$
- (d) $Emp_No \rightarrow Dept_No$
- (e) $Emp_name, Dept_No \rightarrow Mgr_No$

40) Consider the WAREHOUSE relation and its functional dependencies.

<u>w-code</u>	<u>prod-code</u>	prod-name	prod-qty	mgr-code	mgr-name
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Functional Dependencies

- I. $prod-code \rightarrow prod-name$
- II. $mgr-code \rightarrow mgr-name$
- III. $w-code \rightarrow mgr-code, mgr-name$
- IV. $w-code, prod-code \rightarrow prod-qty$

Which of the following statements is/are true for the above relation?

- (a) Fully functional dependency exists between prod-code and prod-name
- (b) Transitive dependency exists between mgr-code and mgr-name
- (c) The WAREHOUSE relation is in the 2NF
- (d) The WAREHOUSE relation is in the 3NF
- (e) The composite key w-code, p-code determines the unique records in the relation
