



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2018 – 1st Year Examination – Semester 2

IT2305 – Database Systems I
Multiple Choice Question Paper

23rd September, 2018
(TWO HOUR)

Important Instructions :

- The duration of the paper is **2 (two) hour**.
- The medium of instruction and questions is English.
- The paper has **40 questions** and **15 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 is 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 is 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.

1) Which of the following statements is/are correct with respect to DBMS languages?

- (a) DDL provides operators for manipulating data.
- (b) DML provides operators for retrieving data.
- (c) DML statements have to specify which data are to be retrieved and how to retrieve them.
- (d) DML statements have to specify which data are to be retrieved rather than how to retrieve them.
- (e) SQL is a declarative language.

2) Which of the following functions is/are typically performed by a database administrator?

- (a) Planning, designing and implementing database systems.
- (b) Allocation of storage locations and data structure.
- (c) Establishing standards and procedures for database systems.
- (d) Viewing a database system from the perspective of the functions it should perform.
- (e) Communicating with database users.

3) Consider the following statements:

- A. An entity integrity constraint states that no primary key value can be null.
- B. A referential integrity constraint is specified between two relations.
- C. A foreign key cannot be used to refer to its own relation.

Identify which of the above statements is/are correct

- (a) Only A.
- (b) Only B.
- (c) Only B and C.
- (d) Only A and B.
- (e) All.

4) Protecting a database from unauthorized or malicious use is termed as

- (a) Data integrity.
- (b) Concurrent processing.
- (c) Data security.
- (d) Data recovery.
- (e) Performance evaluation.

5) Select the correct statement(s) from the following regarding foreign keys.

- (a) A foreign key is a set of attributes in one relation that corresponds to a primary key in another relation.
- (b) A foreign key is a set of attributes in one relation which may corresponds to a primary key in the same relation.
- (c) A foreign key should be a candidate key in a relation.
- (d) Foreign keys are needed to logically link data in one relation with data in another relation.
- (e) A foreign key attribute needs to have the same name as the primary key attribute to which it corresponds.

6) Which of the following statements is/are correct in relation to weak entities?

- (a) They do not have key attributes of their own.
- (b) The attributes are always multi-valued.
- (c) They have an owner entity.
- (d) The relationship between a weak entity and an owner entity is always 1: N.
- (e) They have their own key attributes.

7) What is the best definition for **meta data** in databases?

- (a) Elementary-level data items (fields/attributes).
- (b) Different views and different representations of the same data.
- (c) Relationships that exists between various data structures.
- (d) Data that describe the properties or characteristics of data.
- (e) Indexes that are used to access data quickly.

8) Consider the following statements.

- (i) Course name = Computer Systems
- (ii) Course number = CS1108
- (iii) Number of credits = 3
- (iv) Compulsory = yes

Select the best possible data type for each of the above data elements respectively from the following,

- (a) INTEGER, BOOLEAN, INTEGER, STRING
- (b) VARCHAR, BYTE, BOOLEAN, INTEGER
- (c) VARCHAR, CHAR, INTEGER, BOOLEAN
- (d) TEXT, CHARACTER, NUMBER, BOOLEAN
- (e) TEXT, TEXT, INTEGER, BOOLEAN

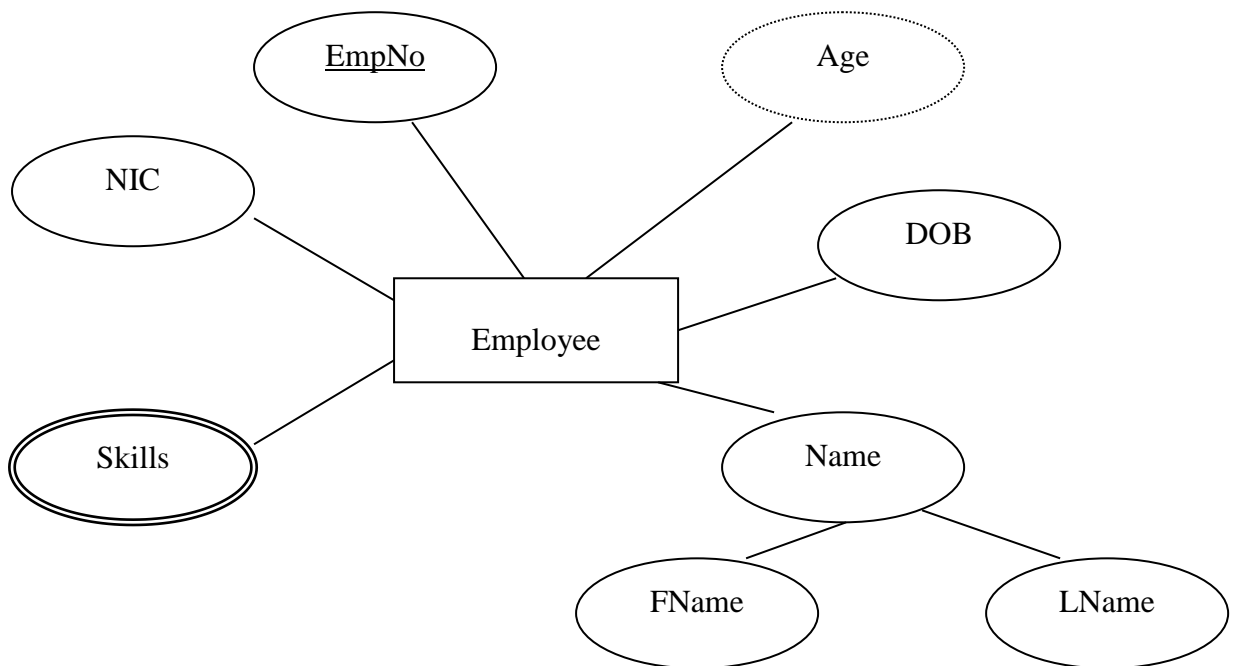
- 9) Consider the following statements about mapping many-to-many (M: N) binary relationships in an Entity Relationship Diagram (ERD) to a set of relations.

- (i) A new relation will be created and primary keys of the entities will be copied to the new relation to act as foreign keys.
- (ii) Attributes of the relationship will be dropped.
- (iii) A new relation will be created and primary keys of the entities will be combined to create the primary key in the new relation.

Which of the following statements is/are correct?

- (a) (i) only
- (b) (ii) only
- (c) (iii) only
- (d) (i) and (iii) only
- (e) All

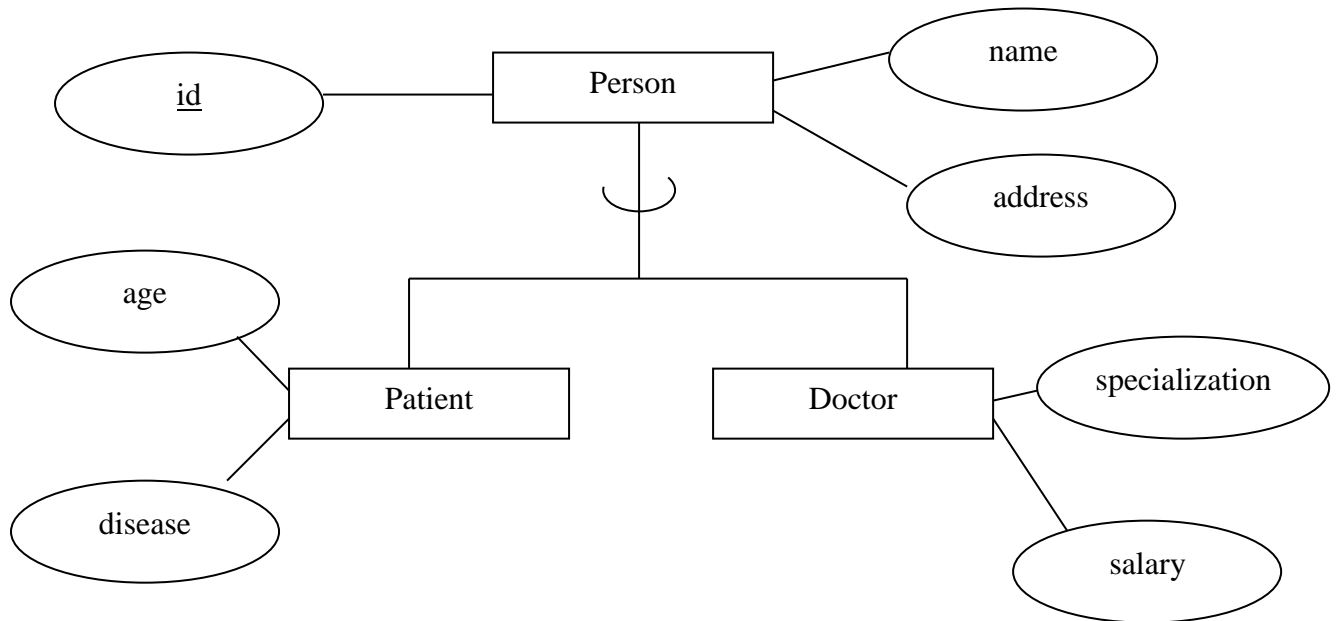
- 10) Consider the following ER diagram.



Which of the following statements is/are correct?

- (a) "EmpNo" is the key.
- (b) "Age" is a composite attribute.
- (c) "Name" is a multi-valued attribute
- (d) "Skills" is a derived attribute.
- (e) "Employee" is a strong entity.

- 11) Consider the following Entity-Relationship Diagram (ERD).



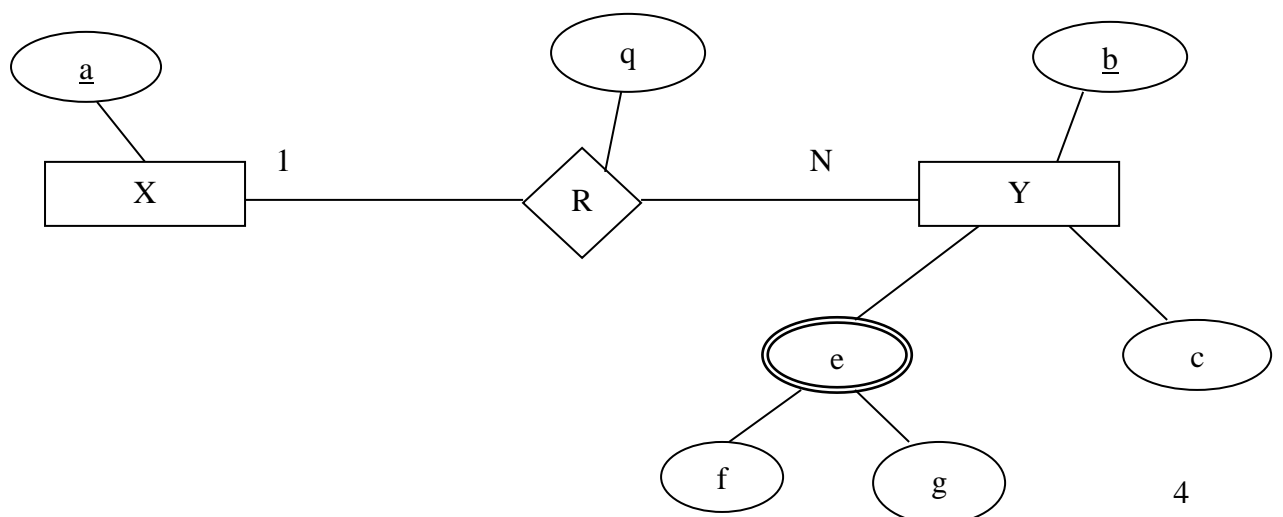
Consider the following statements.

- (i) Person (id, name, address)
- (ii) Person (id, disease, age, specialization, salary)
- (iii) Patient (id, disease, age)
- (iv) Patient (id, name, address, disease, age)
- (v) Doctor (id, specialization, salary)
- (vi) Doctor (id, name, address, specialization, salary)

Which of the above represents the most appropriate relation(s) if the above ERD is mapped into a relational model?

- (a) (i), (iii), (v)
- (b) (i), (iv), (vi)
- (c) (ii)
- (d) (ii), (iii), (iv)
- (e) (iv), (vi)

- 12) Consider the following ER diagram.



What would you get when entity Y is mapped to the corresponding relation(s) in a relational model, where Y_E is a possible representation for attribute e of entity Y?

- (a) Y(b, c, f, g, a)
- (b) Y(b, c, e, a, q)
- (c) Y (b, c, a,q)
- (d) Y_E (b, e, a)
- (e) Y_E (b, f, g)

13) Consider the following five tasks.

- (i) Changing data in one or more rows in a table
- (ii) Defining a view
- (iii) Removing a row from a table
- (iv) Changing data in a particular column
- (v) Removing a view

Which SQL command(s) has/have to be used respectively to accomplish the above five tasks?

- (a) (i) ALTER (ii) CREATE (iii) DELETE (iv) UPDATE (v) DROP
- (b) (i) ALTER (ii) CREATE (iii) INSERT (iv) UPDATE (v) DELETE
- (c) (i) UPDATE (ii) CREATE (iii) DELETE (iv) UPDATE (v) DROP
- (d) (i) UPDATE (ii) CREATE (iii) DROP (iv) INSERT (v) UPDATE
- (e) (i) UPDATE (ii) CREATE (iii) UPDATE (iv) INSERT (v) DROP

14) Which of the following commands is/are in the Data Definition Language (DDL).

- (a) CREATE
- (b) SELECT
- (c) GRANT
- (d) REVOKE
- (e) ALTER

15) Which of the following operations is/are part of the five basic set operations in relational algebra?

- (a) Join
- (b) Union
- (c) Division
- (d) Cartesian Product
- (e) Set Difference

Consider the following SQL table declarations for three tables T1, T2, and T3 to answer questions from (16) to (17).

```
CREATE TABLE T1 (A INT PRIMARY KEY);
```

```
CREATE TABLE T2 (B INT PRIMARY KEY, FOREIGN KEY (B) REFERENCES T1(A) on  
UPDATE CASCADE);
```

```
CREATE TABLE T3 (C INT PRIMARY KEY, FOREIGN KEY (C) REFERENCES T2(B) on  
UPDATE CASCADE);
```

Let the initial contents of the tables be:

T1 (A) = {(1), (2), (3), (4), (15), (5), (17), (11), (19)}

T2 (B) = {(1), (2), (4), (5), (15), (17)}

T3(C) = {(1), (2), (5), (15)}

Suppose the following SQL modification command is executed.

```
UPDATE T1 SET A = A + 5 WHERE A < 10;
```

- 16) What would be the result if the following command is executed subsequently?

```
SELECT SUM(B) FROM T2;
```

- (a) 25
- (b) 64
- (c) 71
- (d) 53
- (e) 44

- 17) What would be the result if the following command is executed?

```
SELECT SUM(C) FROM T3;
```

- (a) 45
- (b) 19
- (c) 54
- (d) 38
- (e) 23

Consider the following schema to answer questions from (18) to (21). Primary Keys are underlined and Foreign Keys are in Bold italics. Lectures can teach courses offered by other departments as well.

Lecturer (EmpNo, Name, Gender, Salary, Category, *DNo*).
 Department (DNo, Dname, *HeadEmpNo*)
 Course (CNo, Cname, Credits, *DNo*)
 Deliver (EmpNo, CNo, Hours)
 Research_Fund (RFName, *EmpNo*, Amount)

The symbols π , σ , \bowtie , \bowtie_r , \bowtie_l , \cup , \cap , and $-$ are used to denote the relational operators Projection, Selection, Natural Join, Right Outer Join, Left Outer Join, Union, Intersection and Set difference respectively.

- 18) Consider the following operation on the Course relation.

$$\text{RESULT1} \leftarrow \pi_{\text{CNo}} (\sigma_{\text{DNo}=1} (\text{Course}))$$

What would be in RESULT1 after the above operation is performed?

- (a) Names of the Courses belonging to department No.1
- (b) Names of the Courses not belonging to department No.1
- (c) Course numbers belonging to department No.1
- (d) Course names and Course numbers belonging to department No.1
- (e) Course numbers not belonging to department No.1

- 19) Which of the following sequences of operations would list the names of department heads who have at least one Research fund?

- (a) HEADS(EmpNo) \leftarrow $\pi_{\text{HeadEmpNo}}(\text{Department})$
 RESULT1 \leftarrow $\pi_{\text{EmpNo}}(\text{Research_Fund})$
 RESULT2 \leftarrow RESULT1 \cap HEADS
 RESULT \leftarrow $\pi_{\text{Name}}(\text{RESULT2} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Lecturer})$
- (b) HEADS(EmpNo) \leftarrow $\pi_{\text{HeadEmpNo}}(\text{Department})$
 RESULT1 \leftarrow $\pi_{\text{EmpNo}}(\text{Research_Fund})$
 RESULT2 \leftarrow RESULT1 \cup HEADS
 RESULT \leftarrow $\pi_{\text{Name}}(\text{RESULT2} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Lecturer})$
- (c) HEADS(EmpNo) \leftarrow $\pi_{\text{HeadEmpNo}}(\text{Department} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Research_Fund})$
 RESULT \leftarrow $\pi_{\text{Name}}(\text{HEADS} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Lecturer})$
- (d) HEADS(EmpNo) \leftarrow $\pi_{\text{HeadEmpNo}}(\text{Department})$
 RESULT1 \leftarrow $\pi_{\text{EmpNo}}(\text{Research_Fund})$
 RESULT2 \leftarrow RESULT1 $-$ HEADS
 RESULT \leftarrow $\pi_{\text{Name}}(\text{RESULT2} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Lecturer})$
- (e) HEADS(EmpNo) \leftarrow $\pi_{\text{HeadEmpNo}}(\text{Department})$
 RESULT1 \leftarrow $\pi_{\text{EmpNo}}(\text{Research_Fund})$
 RESULT2 \leftarrow RESULT1 $\bowtie_{\text{EmpNo}=\text{EmpNo}}$ HEADS
 RESULT \leftarrow $\pi_{\text{Name}}(\text{RESULT2} \bowtie_{\text{EmpNo}=\text{EmpNo}} \text{Lecturer})$

- 20) Which of the following sequences of operations would produce the EmpNo, Name and Category of all the lecturers and the department name if the lecturer is a head of a department.

- (a) $\pi_{\text{EmpNo, Name, Category, Dname}}(\text{Lecturer} \bowtie_{\text{EmpNo=HeadEmpNo}} \text{Department})$
 (b) $\pi_{\text{EmpNo, Name, Category, Dname}}(\text{Lecturer} \bowtie_{\text{DNo=DNo}} \text{Department})$
 (c) $\pi_{\text{EmpNo, Name, Category, Dname}}(\text{Lecturer} \bowtie_{\text{EmpNo=HeadEmpNo}} \text{Department})$
 (d) $\pi_{\text{EmpNo, Name, Category, Dname}}(\text{Lecturer} \bowtie_{\text{EmpNo=HeadEmpNo}} \text{Department})$
 (e) $\pi_{\text{EmpNo, Name, Category, Dname}}(\text{Lecturer} \bowtie_{\text{DNo=DNo}} \text{Department})$

- 21) Which of the following sequences of operations would find the names of Lecturers who have no research fund?

- (a) $\text{RES1} \leftarrow \pi_{\text{EmpNo}}(\text{Research_Fund})$
 $\text{RESULT} \leftarrow \pi_{\text{Name}}(\text{Lecturer} - \text{RES1})$
 (b) $\text{RES1} \leftarrow \pi_{\text{EmpNo, Name}}(\text{Lecturer})$
 $\text{RES2} \leftarrow \pi_{\text{EmpNo}}(\text{Research_Fund})$
 $\text{RESULT} \leftarrow (\text{RES1} - \text{RES2})$
 (c) $\text{RES1} \leftarrow \pi_{\text{EmpNo, Name}}(\text{Lecturer})$
 $\text{RES2} \leftarrow \pi_{\text{EmpNo}}(\text{Research_Fund})$
 $\text{RESULT} \leftarrow (\text{RES1} \cup \text{RES2})$
 (d) $\text{RES1} \leftarrow \pi_{\text{EmpNo}}(\text{Lecturer})$
 $\text{RES2} \leftarrow \pi_{\text{EmpNo}}(\text{Research_Fund})$
 $\text{RES3} \leftarrow (\text{RES1} - \text{RES2})$
 $\text{RESULT} \leftarrow \pi_{\text{Name}}(\text{RES3} \bowtie_{\text{EmpNo=EmpNo}} \text{Lecturer})$
 (e) $\text{RES1} \leftarrow \pi_{\text{EmpNo}}(\text{Research_Fund})$
 $\text{RES2} \leftarrow \pi_{\text{EmpNo}}(\text{Lecturer})$
 $\text{RES3} \leftarrow (\text{RES1} - \text{RES2})$
 $\text{RESULT} \leftarrow \pi_{\text{Name}}(\text{RES3} \bowtie_{\text{EmpNo=EmpNo}} \text{Lecturer})$

Consider the following Doctor relation with the given attributes and data types to answer questions from (22) to (24). Assume that the attributes are stated in the order that they were specified in the create table statement. DocId is the Primary Key.

Doctor (DocId CHAR(03), DName VARCHAR(50), Salary_Per_Month REAL, Specialization VARCHAR(50), DateHired DATE, Annual_Bonus REAL)

- 22) Which of the following SQL statements display the name and annual income for each doctor?

Hint: Annual income includes the Annual Bonus.

- (a) SELECT DName, (Salary_Per_Month*12) + Annual_Bonus FROM Doctor;
- (b) SELECT DName, Salary_Per_Month*12 as Annual Income FROM Doctor;
- (c) SELECT DName, "Annual Income" FROM Doctor WHERE "Annual Income" = Salary_Per_Month*12 + Annual_Bonus;
- (d) SELECT DName , Salary_Per_Month*12 + Annual_Bonus 'Annual Income' FROM Doctor;
- (e) SELECT DName, Salary_Per_Month + Annual_Bonus as Annual Payment FROM Customer;

- 23) Which of the following SQL statements would display all doctor's names and hired dates sorted in the ascending order of DateHired?

- (a) SELECT DName, DateHired FROM Doctor ORDER BY DateHired;
- (b) SELECT DName, DateHired FROM Doctor ORDER BY DName, DateHired;
- (c) SELECT DName, DateHired FROM Doctor SORT BY DName, DateHired;
- (d) SELECT DName, DateHired FROM Doctor SORT BY DateHired;
- (e) SELECT DName, DateHired FROM Doctor ORDER BY DateHired ASC;

- 24) Consider the following details of a Doctor. Note SYSDATE returns the current system date.

DocId – 302, DName – Oshan Chinthana, Salary_Per_Month - 75,000, Specialization – Pediatrics, DateHired - SYSDATE, Annual_Bonus - 50000)

Which of the following SQL statements will insert the above data into Customer relation?

- (a) INSERT INTO Doctor
VALUES ('302', 'Oshan Chinthana', 75000, 'Pediatrics', SYSDATE, 50000);
- (b) INSERT INTO Doctor (DocID, DName, Salary_Per_Month, Specialization, DateHired, Annual_Bonus)
VALUES ('302', 'Oshan Chinthana', 75000, 'Pediatrics', SYSDATE, 50000);
- (c) INSERT INTO Doctor (DocID, Salary_Per_Month, DName, Specialization, DateHired, Annual_Bonus)
VALUES ('302', 75000, 'Oshan Chinthana', 'Pediatrics', SYSDATE, 50000);
- (d) INSERT INTO Doctor
VALUES ('302', 'Oshan Chinthana', 75000, Pediatrics, SYSDATE, 50000);
- (e) INSERT (DocID, DName, Salary_Per_Month, Specialization, DateHired, Annual_Bonus)
VALUES ('302', 75000, 'Oshan Chinthana', Pediatrics, SYSDATE, 50000)
INTO Doctor;

25) Suppose a relation is declared as follows.

```
CREATE TABLE Employee (Name VARCHAR(50) PRIMARY KEY,  
Payment INT CHECK(Payment > 75,000) );
```

Initially, the relation has three records:

Name	Payment
Ashintha	100,000
Oshan	120,000
Tharinda	140,000

Assume that the following sequence of SQLs are executed on this table. Some of them may be rejected due to the constraints defined on the relation.

- (i) INSERT INTO Employee VALUES ('Upul', 120000);
- (ii) UPDATE Employee SET Payment = 150000 WHERE Name = 'Tharinda';
- (iii) INSERT INTO Employee VALUES ('Anuradhini', 65000);
- (iv) DELETE FROM Employee WHERE Name = 'Ashintha';

After the execution of the above SQL statements, the sum of the Payments over all the tuples in Employee relation would be:

- (a) 390,000
- (b) 455,000
- (c) 65,0000
- (d) 555,000
- (e) 370,000

26) Consider the relation Employee (Empid, NIC, Fname, Lname, Address, Salary) with the following functional dependencies

Empid \rightarrow NIC, Fname, Lname, Address, Salary
NIC \rightarrow Fname, Lname, Address

What is the best normal form that the Employee relation satisfies?

- (a) 0NF
- (b) 1NF
- (c) 2NF
- (d) 3NF
- (e) BCNF

27) Consider the following SQL statement.

GRANT SELECT, INSERT, DELETE, UPDATE ON Employee TO Roshan;

Which of the following statements is/are correct?

- (a) Roshan is given the rights to retrieve data in the 'Employee' relation.
- (b) Roshan is given the rights to update data in the 'Employee' relation.
- (c) Roshan cannot delete any records in the 'Employee' relation.
- (d) Roshan is granted permission to grant select, insert, delete and update privileges to other users.
- (e) This command will not work as it is syntactically incorrect.

28) A certain operation applied on relations A and B will result in relation C as shown below.

A

Sup_ID	Prod_ID
S001	A001
S002	A003
S012	A002
S012	A003
S003	B001
S001	B002
S012	B001
S012	A001
S004	B002
S004	B001

B

Prod_ID	Name
A001	Milk Packet
A002	Ice Cream
A003	Cheese
B001	Soft Drink
B002	Milk Coffee

C

Sup_ID	Prod_ID	Name
S001	A001	Milk Packet
S002	A003	Cheese
S012	A002	Ice Cream
S012	A003	Cheese
S003	B001	Soft Drink
S001	B002	Milk Coffee
S012	B001	Soft Drink
S012	A001	Milk Packet
S004	B002	Milk Coffee
S004	B001	Soft Drink

Which of the following is/are the possible operation(s)?

- (a) Projection
- (b) Cartesian Product
- (c) Selection
- (d) Natural Join
- (e) Union Operation

Consider the relation R1 (P, Q, R, S, T) with the following Functional Dependencies to answer questions from (29) to (31).

$R, T \rightarrow S$ $S \rightarrow Q$ $R \rightarrow P$

29) Which is/are the candidate key(s) of the relation R1?

- (a) (R,S)
- (b) (R,P)
- (c) (R,T)
- (d) T
- (e) R

30) Which of the following statements is/are true?

- (a) The Functional dependency $R \rightarrow P$ violates 1 NF.
- (b) The best normal form the relation R1 satisfies is 1 NF.
- (c) The Functional dependency $S \rightarrow Q$ violates 2 NF.
- (d) The best normal form the relation R1 satisfies is 2 NF.
- (e) The Functional dependency $S \rightarrow Q$ violates 3 NF.

31) Which of the following statements is/are true with respect to the decomposition of R1 for BCNF?

- (a) R1 is in BCNF and no further decomposition is required.
- (b) This cannot be decomposed into BCNF preserving functional dependency.
- (c) The BCNF decomposition is (P, R), (Q, R, S, T)
- (d) The BCNF decomposition is (P, R), (R, S, T), (Q, S)
- (e) The BCNF decomposition is (P, R, T), (Q, S), (R, S)

32) Which of the following statements is/are true with respect to SQL?

- (a) SQL is declarative and is based on relational algebra.
- (b) SQL is interactive via GUI or command prompt, or embedded in programs.
- (c) SQL is supported by all major commercial relational database management systems.
- (d) SQL is supported by all object relational database management systems.
- (e) SQL is a database programming language and not a database administration language.

- 33) Consider the following two relations. Primary keys are in bold font and Foreign key is underlined.

Lecturer (**Lec_ID**, Lec_Name, Designation, DoB, Dept)
Department (**Dept_Code**, Dep_Name, Dept_Head)

Select the SQL statement(s) which creates a view to see the Department Code and the number of lecturers in each department.

- (a) CREATE VIEW Dept_Lectures (Dept_Code, No_of_Lecturers) AS SELECT Dept, Count(*) FROM Lecturer GROUP BY Dept
- (b) CREATE VIEW Dept_Lecturers (Dept_Code, No_of_Lecturers) AS SELECT Dept, Count(Dept_Code) FROM Lecturer GROUP BY Dept
- (c) CREATE VIEW Dept_Lecturers (Dept_Code, No_of_Lecturers) AS SELECT Dept, Count(*) FROM Lecturers GROUP BY Lec_ID
- (d) CREATE VIEW Dept_Lectures (Dept_Code, No_of_Lecturers)
- (e) CREATE VIEW Dept_Lecturers (Dept_Code, No_of_Lectures) AS SELECT Dept, Count(DISTINCT Lec_ID) FROM Lecturer GROUP BY Dept

- 34) Which of the following statements is/are correct with respect to views?

- (a) Any view defined using a single table is updatable.
- (b) Query materialization is efficient for views defined via complex queries which are time consuming to execute.
- (c) The clause **WITH CHECK OPTION** is used to materialize views.
- (d) The view mechanism provides support for physical data independence in the relational model.
- (e) The **DROP VIEW** command will drop a view along with the other views which are defined on the view that is being dropped.

- 35) Consider the relation Department (Did, Dname, Office, Phone) with functional dependencies

Did → Dname, Office, Phone
Office → Phone

What is the best normal form that Department satisfies?

- (a) 0NF
- (b) 1NF
- (c) 2NF
- (d) 3NF
- (e) BCNF

36) Which of the following constraints is/are inherent model based constraints with respect to the relational model?

- (a) Primary Key cannot be null (Entity integrity).
- (b) Each attribute value should be atomic.
- (c) Primary key should be unique (Key constraint).
- (d) Attribute values should be drawn from a particular domain (Domain constraint).
- (e) When one relation refers to another relation, it should refer to an existing tuple (Referential integrity).

37) Consider the following SQL statement.

**GRANT SELECT,
UPDATE (Employee_Name) ON Employees TO Tharinda, Oshan WITH GRANT OPTION;**

Which of the following statements is/are true about the above SQL statement.

- (a) Grant permission to Tharinda only to retrieve data from Employees table and grant permission to Oshan only to update the Employee_Name from Employees table.
- (b) Grant permission to Tharinda and Oshan to retrieve data from Employees table.
- (c) Grant permission to Oshan to grant, select and update permission to Tharinda.
- (d) Grant permission to Tharinda and Oshan to update Employee_Name in the Employees table.
- (e) Grant permission to Tharinda and Oshan to update all data except Employee_Name in Employees table.

38) Which of the following statements is/are true in relation to Data Mining?

- (a) Data Mining refers to the discovery of new information from present data.
- (b) Data Mining is similar to an SQL query
- (c) Data Mining requires a large amount of data.
- (d) Data Mining can be done even with small amounts of data.
- (e) Data Mining uses pattern matching techniques.

39) Suppose that the relation R1 (A, B) has tuples {(P, Q), (P, R), (R, S)}, and the relation R2 (B, C) has tuples {(Q, T), (R, T), (S, U), (V, W)}.

Consider the following SQL query.

SELECT * FROM R1 LEFT OUTER JOIN R2 ON R1.B = R2.B;

What is the number of tuples in the result of the above SQL query?

- (a) 2
- (b) 3
- (c) 5
- (d) 6
- (e) 4

40)

Consider the relation Inventory (PartNo, Warehouse, Location, Quantity, Weight, Colour) with the following functional dependencies.

FD1: PartNo \rightarrow Weight, Colour

FD2 : (PartNo, Warehouse) \rightarrow Quantity

FD3 : Warehouse \rightarrow Location

Which of the following statements is/are correct?

- (a) The functional dependency FD1 violates 2NF.
- (b) The functional dependency FD2 violates 1NF.
- (c) The functional dependency FD3 violates 3NF.
- (d) The best normal form that Inventory satisfies is 1NF.
- (e) The best normal form that Inventory satisfies is 2NF.
