



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2006/2007 – 1st Year Examination – Semester 2

IT2303 - Database Systems 1

12th August 2007

(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 **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 will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 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.**

- 1) Consider the following statements.
- (i) A data model is a collection of high-level data description constructs which hide many low-level storage details.
 - (ii) A DBMS allows a user to define the data to be stored in terms of a data model.
 - (iii) Most DBMS today are based on the relational data model.

Which of the above statements is/are correct with respect to describing and storing data in DBMS?

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

- 2) Which of the following is/are correct with respect to a data dictionary system?

- | |
|--|
| (a) It stores information such as design decisions usage standards, application program descriptions and user information. |
| (b) It stores catalog information about schemas and constraints. |
| (c) The Database Administration cannot access this information directly. |
| (d) It is a sub system that keeps track of the definitions of all the data items in the database. |
| (e) It is also called an information repository. |

- 3) Consider the following statements about metadata.

- (i) Metadata describes the properties or characteristics of other data.
- (ii) Metadata is a collection of records of all the data types.
- (iii) Metadata allows database designers and users to understand what data exist and what the data mean.

Which of the above statements is/are correct?

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

- 4) Which of the following is/are correct with respect to the three-level database architecture?

- | |
|--|
| (a) It is a generalized frame work for database systems to represent the distribution between logical and physical data. |
| (b) Conceptual level is the database structural level that defines logical schema of the database. |
| (c) External level is the database structural level that defines physical views of the database. |
| (d) Internal level is the database structural level that defines user views of the database. |
| (e) The implementation of these three levels requires the database management system to translate from one level to another. |

- 5) Which of the following operations about Relational Algebra is correct?

- | |
|--|
| (a) The π operation is used to select a subset of the tuples from a relation that satisfies a given selection condition. |
| (b) The σ operation selects certain columns from a relation and discards the other columns. |
| (c) The $-$ operation can be used to include all the tuples which can be found in one relation, but not in the other. |
| (d) The \times operation is used to combine tuples from two relations in a combinatorial fashion. |
| (e) The \cap operation is used to include all the tuples which can be found in either of two relations. |

6) Which of the following tasks are responsibilities of database administrator (DBA)?

- (a) Design of the conceptual and physical schemas
- (b) Security and authorization
- (c) Data availability and recovery from failures
- (d) Create and use the database
- (e) Database tuning

7) Consider the following two relations.

Employees

FirstName	Surname
Amal	Silva
Bimal	Perera
Chamil	Soysa
Damith	Alwis

Managers

Fname	Sname
Amal	Silva
Eshan	Guruge
Frank	Kumara

Which of the following statements is/are correct with respect to the two relations given above?

- (a) The two relations are Union Compatible.
- (b) The two relations are not Union Compatible because each has a different number of tuples.
- (c) The two relations are not Union Compatible because their attribute names are different.
- (d) The two relations are not Union Compatible because they have different tuple content.
- (e) We can find the names of the employees who are also managers using the $\text{Employees} \cap \text{Managers}$.

8) Which of the following sets of operations represent a complete set?

- (a) $\{\sigma, \pi, \times, \cup, -\}$
- (b) $\{\sigma, \pi, \times, \cap, -\}$
- (c) $\{\sigma, \pi, \times, \cup, \cap\}$
- (d) $\{\sigma, \pi, \times, \cup, -, \cap\}$
- (e) $\{\sigma, \pi, \times, \cup, *\}$

9) Which of the following SQL statements are usually embedded in a host language such as C, COBOL or PASCAL?

- (a) stored procedure
- (b) queries
- (c) updates
- (d) view definitions
- (e) triggers

10) Consider the following two relations.

A (Students)

St_Id	Name	Address
1000000004	Bimal	Colombo
1000000001	Damith	Kandy
1000000008	Amal	Galle
1000000002	Chamil	Jaffna

B

St_Id	Name	Address
1000000001	Damith	Kandy
1000000002	Chamil	Jaffna
1000000004	Bimal	Colombo
1000000008	Amal	Galle

Applying a certain SQL statement to relation A gives relation B. Which of the following statements could this SQL statement be?

- (a) `SELECT * FROM Students ORDER BY St_Id;`
- (b) `SELECT * FROM Students ORDER BY Name;`
- (c) `SELECT * FROM Students ORDER BY St_Id DESC;`
- (d) `SELECT * FROM Students ORDER BY Name DESC;`
- (e) `SELECT * FROM Students ORDER BY St_Id, Name ASC;`

11) Which of the following statements is/are correct, regarding tuples?

- (a) A relation is defined as a set of tuples.
- (b) Each attribute in a tuple is an atomic value.
- (c) An attribute in a tuple might be NULL.
- (d) Tuples in a relation have a particular order.
- (e) Attributes in a tuple have a particular order.

12) A set of attributes FK in relation schema R1 is a foreign key of R1 that references relation R2. Which of the following statements could be true?

- (a) The attributes FK are said to reference the relation R2.
- (b) The attributes in FK have the same domain(s) as the primary key attribute PK of R2.
- (c) The attributes FK are said to reference the relation R1.
- (d) FK must always have at least two attributes.
- (e) R1 and R2 might be one and the same.

Based on the following three relations, answer questions 13 and 16.

Students(Student_Id, Student_Name, Address)
Subjects(Subject_Id, Subject_Name, Lecturer_Id)
Results(Student_Id, Subject_Id, Marks)

13) Which of the following instructions can be used to find the Subject_Id of the subject named "Mathematics"?

- (a) $\pi_{\text{Subject_Id}}(\sigma_{\text{Subject_Name}=\text{"Mathematics"}}(\text{Subjects}))$
- (b) $\sigma_{\text{Subject_Id}}(\sigma_{\text{Subject_Name}=\text{"Mathematics"}}(\text{Subjects}))$
- (c) $\pi_{\text{Subject_Id}}(\pi_{\text{Subject_Name}=\text{"Mathematics"}}(\text{Subjects}))$
- (d) $\sigma_{\text{Subject_Id}}(\pi_{\text{Subject_Name}=\text{"Mathematics"}}(\text{Subjects}))$
- (e) $\pi_{\text{Subject_Id}}(\pi_{\text{Subject_Id}}(\sigma_{\text{Subject_Name}=\text{"Mathematics"}}(\text{Subjects})))$

14) Which of the following instructions can be used to list only the names of all students who have more than 50 marks for the subject named "English"?

- (a) $\pi_{\text{Student_Name}}((\sigma_{\text{Marks}>50}(\text{Results}) *_{\text{Subject_Id=Subject_Id}} \sigma_{\text{Subject_Name}=\text{"English"}}(\text{Subjects})) *_{\text{Student_Id=Student_Id}} (\text{Students}))$
- (b) $\pi_{\text{Student_Name}}(\sigma_{\text{Marks}>50}((\text{Results}) *_{\text{Subject_Id=Subject_Id}} \sigma_{\text{Subject_Name}=\text{"English"}}(\text{Subjects})) *_{\text{Student_Id=Student_Id}} (\text{Students}))$
- (c) $\pi_{\text{Student_Name}}(\sigma_{\text{Subject_Name}=\text{"English"}}((\sigma_{\text{Marks}>50}(\text{Results}) *_{\text{Subject_Id=Subject_Id}} (\text{Subjects})) *_{\text{Student_Id=Student_Id}} (\text{Students})))$
- (d) $\pi_{\text{Student_Name}}(\sigma_{\text{Marks}>50 \text{ AND } \text{Subject_Name}=\text{"English"}}((\text{Results}) *_{\text{Subject_Id=Subject_Id}} (\text{Subjects})) *_{\text{Student_Id=Student_Id}} (\text{Students})))$
- (e) $\pi_{\text{Student_Name}}(\sigma_{\text{Marks}>50 \text{ AND } \text{Subject_Name}=\text{"English"}}((\text{Results}) *_{\text{Student_Id=Student_Id}} (\text{Students})) *_{\text{Subject_Id=Subject_Id}} (\text{Subjects}))$

15) Which of the following SQL statements perform(s) the indicated task?

- (a) Retrieve the names of all students who have sat the 'Physics' examination.

```
SELECT Student_Name FROM Students S, Subjects B, Results R
WHERE S.Student_Id = R.Student_Id
AND B.Subject_Id = R.Subject_Id
AND S.Subject_Name = 'Physics';
```
- (b) Retrieve the names of all students who have obtained over 50 marks for 'Chemistry'.

```
SELECT Names FROM Students S, Subjects B, Results R
WHERE S.Student_Id = R.Student_Id
AND B.Subject_Id = R.Subject_Id
AND S.Subject_Name = 'Chemistry' AND R.Marks >50;
```
- (c) Retrieve the ids of all students who have obtained between and including 20 and 40 marks for 'Mathematics'.

```
SELECT Student_Id FROM Subjects B, Results R
WHERE B.Subject_Id = R.Subject_Id
AND Subject_Name = 'Mathematics'
AND R.Marks BETWEEN 20 AND 40;
```
- (d) Retrieve the names of all students who have obtained less than 50 marks for 'Physics'.

```
SELECT Names FROM Students S, Subjects B, Results R
WHERE S.Student_Id = R.Student_Id
AND Subject_Id = Subject_Id
AND B.Subject_Name = 'Physics' AND R.Marks < 50;
```
- (e) Retrieve the ids of all students who have obtained exactly 100 marks for 'Mathematics'.

```
SELECT Student_Id FROM Subjects B, Results R
WHERE B.Subject_Id = R.Subject_Id
AND B.Subject_Name = 'Mathematics' AND R.Marks = 100;
```

16) Which of the following SQL statements perform(s) the indicated task?

- (a) Retrieve the average marks for each subject.

```
SELECT AVG(Marks), Subject_Id FROM Results
GROUP BY Subject_Id;
```
- (b) Retrieve the total marks obtained by each student.

```
SELECT SUM(Marks), Student_Id FROM Results
GROUP BY Student_Id;
```
- (c) Retrieve the average marks for each student who has obtained an average mark above 75.

```
SELECT AVG(Marks), Student_Id FROM Results
GROUP BY Student_Id HAVING Mark>75;
```
- (d) Retrieve the number of students who have taken each subject.

```
SELECT COUNT(Student_Id), Subject_Id FROM Results
GROUP BY Student_Id;
```
- (e) Retrieve the highest mark obtained by a student for each subject.

```
SELECT MAX(Marks), Subject_Id FROM Results
GROUP BY Student_Id;
```

17) Which of the following SQL statements are legal?

- (a) `CREATE TABLE Students(
Student_Id CHARACTER(10) PRIMARY KEY,
Student_Name VARCHAR(100) NOT NULL DEFAULT 'Unknown',
Birth_Date DATE NOT NULL);`
- (b) `CREATE TABLE Students(
Student_Id,
Student_Name,
Birth_Date);`
- (c) `CREATE TABLE Students(
Student_Id CHARACTER(10),
Student_Name VARCHAR(100),
Birthdate DATE NOT NULL);`
- (d) `CREATE TABLE Students(
Student_Id CHARACTER(10) PRIMARY KEY,
Student_Name VARCHAR(100) NOT NULL DEFAULT,
Birth_Date DATE NOT NULL);`
- (e) `CREATE TABLE Students(
Student Id CHARACTER(10) PRIMARY KEY,
Student Name VARCHAR(100) NOT NULL DEFAULT 'Unknown',
Birth_Date DATE Null);`

18) Consider the following three relations.

A (Students)

Student_Id	Name	Address
1000000004	Bimal	Colombo
1000000001	Damith	Kandy
1000000008	Amal	Galle
1000000002	Chamil	Jaffna

B (Results)

Subject_Id	Student_Id	Marks
CSS21231	1000000001	52
CSS21231	1000000002	78
CSS21232	1000000001	89
CSS21232	1000000002	60

C

Student_Id	Student	Address	Subject_Id	Student_Id	Marks
1000000004	Bimal	Colombo	NULL	NULL	NULL
1000000001	Damith	Kandy	CSS21231	1000000001	52
1000000008	Amal	Galle	NULL	NULL	NULL
1000000001	Damith	Kandy	CSS21232	1000000001	89
1000000002	Chamil	Jaffna	CSS21231	1000000002	78
1000000002	Chamil	Jaffna	CSS21232	1000000002	60

Applying a certain SQL statement to A and B will result in relation C as shown above. Which of the following could this SQL statement be?

- (a) `SELECT * FROM Students S RIGHT OUTER JOIN Results R ON
S.Student_Id = R.Student_Id;`
- (b) `SELECT * FROM Students S LEFT OUTER JOIN Results R ON
S.Student_Id = R.Student_Id;`
- (c) `SELECT * FROM Students S FULL OUTER JOIN Results R ON
S.Student_Id = R.Student_Id;`
- (d) `SELECT * FROM Students S INNER JOIN Results R ON
S.Student_Id = R.Student_Id;`
- (e) `SELECT * FROM Students S, Results R
WHERE S.Student_Id = R.Student_Id;`

- 19) Consider the following relation.

```
CREATE TABLE Results(  
    Subject_Id CHARACTER(8),  
    Student_Id CHARACTER(10),  
    Marks INT,  
  
    PRIMARY KEY(Subject_Id, Student_Id),  
    FOREIGN KEY(Subject_Id) REFERENCES Subjects(Subject_Id),  
    FOREIGN KEY(Student_Id) REFERENCES Students(Student_Id)  
);
```

Which of the following statements are true about the above relation?

- (a) (Subject_Id, Student_Id, Marks) is a candidate key for this relation.
- (b) Subject_Id and Student_Id are foreign keys for this relation.
- (c) This relation has a single attribute primary key.
- (d) Subject_Id and Student_Id together form this relation's primary key.
- (e) (Subject_Id, Student_Id) is a candidate key for this relation.

Based on the following relations, answer questions 20 and 21.

- 20) Consider the following relation.

Students

Student_Id	Student_Name	Bursary	BirthDate
1000000004	Bimal	1000.00	1986/01/01
1000000001	Damith	1200.00	1986/02/12
1000000008	Amal	1450.00	1986/02/22
1000000002	Chamil	1450.00	1985/08/13

Which of the following SQL statement(s) perform(s) the indicated task?

- (a) Retrieve the average bursary paid to students rounded to the nearest Rupee.
`SELECT TRIM(AVG(Bursary)+0.5) FROM Students;`
- (b) Retrieve the names of all students born before 1986.
`SELECT Student_Name FROM Students YEAR(BirthDay)<1986;`
- (c) Retrieve the month of each student's birthday, together with the student's name.
`SELECT MONTH(BirthDay), STUDENT_NAME FROM Students;`
- (d) Retrieve the names of all students born before 1986.
`SELECT Student_Name FROM Students UPPER(YEAR(BirthDay),1986);`
- (e) Retrieve the average bursary paid to students rounded to the nearest Rupee.
`SELECT ROUND(AVG(Bursary)) FROM Students;`

- 21) Which one of the following SQL statements will increase each student's Bursary by 15%?

- (a) `UPDATE Students SET Bursary = Bursary*1.15;`
- (b) `UPDATE Students SET Bursary = Bursary+15%`
- (c) `UPDATE Students SET Bursary = Bursary + Bursary*0.15`
- (d) `UPDATE Students.Bursary = Bursary*1.15;`
- (e) `UPDATE Students SET VALUE OF Bursary = Bursary + Bursary*0.15`

22) Consider the following two relations.

Employees(Employee_Id, Emp_Name, Department_Id, Supervisor_Id)
Departments(Department_Id, Department_Name)

Which of the following SQL statements will return the names of all employees who have supervisors working in the 'Accounts' department?

- (a) `SELECT Emp_Name FROM Employees WHERE Supervisor_Id IN (SELECT Employee_Id FROM Employees E, Departments D WHERE E.Department_Id = D.Department_Id AND D.Department_Name = 'Accounts');`
- (b) `SELECT Emp_Name FROM Employees E1 WHERE EXISTS (SELECT Employee_Id FROM Employees E, Departments D WHERE E.Department_Id = D.Department_Id AND D.Department_Name = 'Accounts' AND E1.Supervisor_Id = E.Employee_Id);`
- (c) `SELECT Emp_Name FROM Employees E1 WHERE EXISTS (SELECT * FROM Employees E, Departments E WHERE E.Department_Id = D.Department_Id AND D.Department_Name = 'Accounts' AND E1.Supervisor_Id = E.Employee_Id);`
- (d) `SELECT Emp_Name FROM Employees E WHERE EXISTS (SELECT EMPLOYEE_ID FROM Employees E, Departments D Department_Id = D.Department_Id AND D.Department_Name = 'Accounts' AND E.Supervisor_Id = E.Employee_Id);`
- (e) `SELECT Emp_Name FROM Employees WHERE Supervisor_Id IN (SELECT Employee_Id FROM Employees WHERE Department_Id IN (SELECT Department_Id FROM Departments WHERE Department_Name = 'Accounts'));`

23) Consider the following relation.

Employees

Employee_Id	Employee_Name	Department_Id	Supervisor_Id
1000000004	Bimal	D1	1000000004
1000000001	Damith	D2	1000000004
1000000008	Amal	D1	1000000008
1000000002	Chamil	D2	1000000008

Since an employee's supervisor is also an employee, this relation contains the following referential integrity constraint.

`CONSTRAINT Employees_Supervisor_Id_Fk
FOREIGN KEY (Supervisor_Id) REFERENCES
Employees (Employee_Id) ON DELETE RESTRICT;`

Which of the following SQL statements will result in the deletion of exactly one tuple?

- (a) `DELETE * FROM Employees WHERE Supervisor_Id = '1000000004';`
- (b) `DELETE * FROM Employees WHERE Supervisor_Id = '1000000008';`
- (c) `DELETE * FROM Employees WHERE Employee_Id = '1000000004';`
- (d) `DELETE * FROM Employees WHERE Employee_Id = '1000000008';`
- (e) `DELETE * FROM Employees WHERE Employee_Id = '1000000001';`

24) Consider the following relation.

Employees(Employee_Id, Emp_Name, Department_Id, Supervisor_Id)

Suppose we need to create the following new relation **Supervisors** to contain information about employees who are also supervisors.

Supervisors(Employee_Id, Emp_Name, Department_Id)

Which of the following SQL statements will copy the relevant information from the **Employees** relation to the new **Supervisors** relation?

- (a) INSERT INTO Supervisors(Employee_Id, Emp_Name, Department_Id) VALUES
(SELECT Employee_Id, Emp_Name, Department_Id
FROM Employees);
- (b) INSERT INTO Supervisors(Employee_Id, Emp_Name, Department_Id)
SELECT Employee_Id, Emp_Name, Department_Id FROM Employees
WHERE Employee_Id IN (SELECT Supervisor_Id
FROM Employees);
- (c) INSERT INTO Supervisors(Employee_Id, Emp_Name, Department_Id) VALUES
(SELECT Supervisor_Id, Emp_Name, Department_Id
FROM Employees);
- (d) INSERT INTO Supervisors(Employee_Id, Emp_Name, Department_Id)
SELECT Supervisor_Id, Emp_Name, Department_Id
FROM Employees
WHERE Supervisor_Id IN (SELECT Employee_Id FROM Employees);
- (e) INSERT INTO Supervisors(Employee_Id, Emp_Name, Department_Id)
(SELECT Supervisor_Id, Emp_Name, Department_Id
FROM Employees);

25) Consider the following SQL statement.

```
GRANT SELECT, UPDATE (Employee_Name) ON Employees TO Amal, Bimal  
WITH GRANT OPTION;
```

Which of the following will result from the above SQL statement?

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

26) Consider the following relation.

Student_Id	Subject_Id	Marks	Student_Name	Subject_Name	Has_Passed
1000000004	CSS21001	90	Amali	English	TRUE
	CSS21002	78		Mathematics	TRUE
	CSS21004	12		Chemistry	FALSE
1000000001	CSS21001	22	Bimali	English	FALSE
	CSS21002	32		Mathematics	FALSE
	CSS21003	56		Physics	TRUE
1000000002	CSS21001	77	Chamali	English	TRUE
	CSS21002	77		Mathematics	TRUE
	CSS21003	98		Physics	TRUE
	CSS21003	98		Physics	TRUE
1000000003	NULL	NULL	Damitha	NULL	NULL

Note: All students receiving over 50 MARKS has passed.

Which of the following statements are true?

- (a) This relation is in 1NF but not in 2NF.
- (b) This relation contains NULL values.
- (c) This relation does not contain duplicate records.
- (d) This relation contains repeating groups.
- (e) Attributes Student_Id and Subject_Id together uniquely identify each tuple in this relation. They are one of several possible super-keys.

27) Consider the following relation.

Student_Id	Subject_Id	Marks	Student_Name	Subject_Name	Has_Passed
1000000004	CSS21001	90	Amali	English	TRUE
1000000004	CSS21002	78	Amali	Mathematics	TRUE
1000000004	CSS21004	12	Amali	Chemistry	FALSE
1000000001	CSS21001	22	Bimali	English	FALSE
1000000001	CSS21002	32	Bimali	Mathematics	FALSE
1000000001	CSS21003	56	Bimali	Physics	TRUE
1000000002	CSS21001	77	Chamali	English	TRUE
1000000002	CSS21002	77	Chamali	Mathematics	TRUE
1000000002	CSS21003	98	Chamali	Physics	TRUE

Note: All student receiving over 50 MARKS has passed.

Which of the following statements are true?

- (a) Attributes Marks and Has_Passed are fully functional dependent on (Student_Id, Subject_Id)
- (b) Attributes Student_Name and Subject_Name are each fully functional dependent on Student_Id and Subject_Id, respectively.
- (c) Attributes Marks is fully functional dependent on Student_Id .
- (d) (Student_Id, Subject_Id) \rightarrow (Has_Passed) and (Marks) \rightarrow (Has_Passed)
- (e) This relation is in 2NF but not in 3NF.

28) Consider the following three relations.

Students

<u>Student_Id</u>	<u>Student_Name</u>
1000000004	Amali
1000000001	Bimali
1000000002	Chamali

Subjects

<u>Subject_Id</u>	<u>Subject_Name</u>
CSS21001	English
CSS21002	Mathematics
CSS21004	Chemistry
CSS21003	Physics

Results

<u>Student_Id</u>	<u>Subject_Id</u>	<u>Marks</u>	<u>Has_Passed</u>
1000000004	CSS21001	90	TRUE
1000000004	CSS21002	78	TRUE
1000000004	CSS21004	12	FALSE
1000000001	CSS21001	22	FALSE
1000000001	CSS21002	32	FALSE
1000000001	CSS21003	56	TRUE
1000000002	CSS21001	77	TRUE
1000000002	CSS21002	77	TRUE
1000000002	CSS21003	98	TRUE

Note: All student receiving over 50 MARKS has passed.

Which of the following statements is/are correct?

- (a) All these relations are in 1NF.
- (b) All these relations are in 2NF.
- (c) All these relations are in 3NF.
- (d) (Student_Id, Subject_Id, Marks) is a candidate key for this relation.
- (e) Attribute Has_Passed is transitively dependent on (Student_Id, Subject_Id).

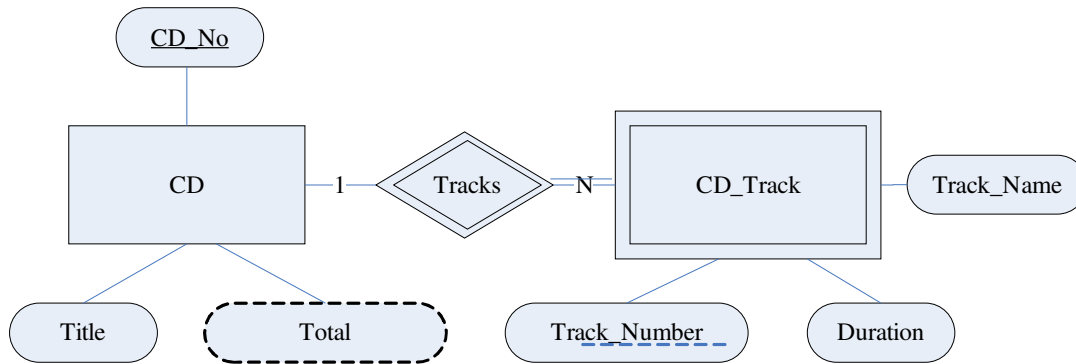
29) A certain database that stores personal information about people also stores the birth date of each person. A person's age can be determined from the current date and the value of that person's birth date which is stored in the database. Which of the following statements is/are correct?

- (a) The person's birth date is known as a derived attribute.
- (b) The person's birth date is known as a stored attribute.
- (c) The person's age is said to be "derivable" from the person's birth date.
- (d) The person's age is known as a derived attribute.
- (e) The person's age is known as a stored attribute.

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

- (a) Weak entity types do not have their own primary key attributes.
- (b) Regular entity types which do have a key attribute are sometimes called strong entity types.
- (c) Entities belonging to a strong entity type are identified by being related to specific entities from another entity type in combination with some of their attribute values.
- (d) Identifying entity types are a special case of weak entity types.
- (e) A weak entity type normally has a partial key. It is a set of attributes which can uniquely identify weak entities related to the same owner entity.

Questions 31 and 32 are based on the following ERD.



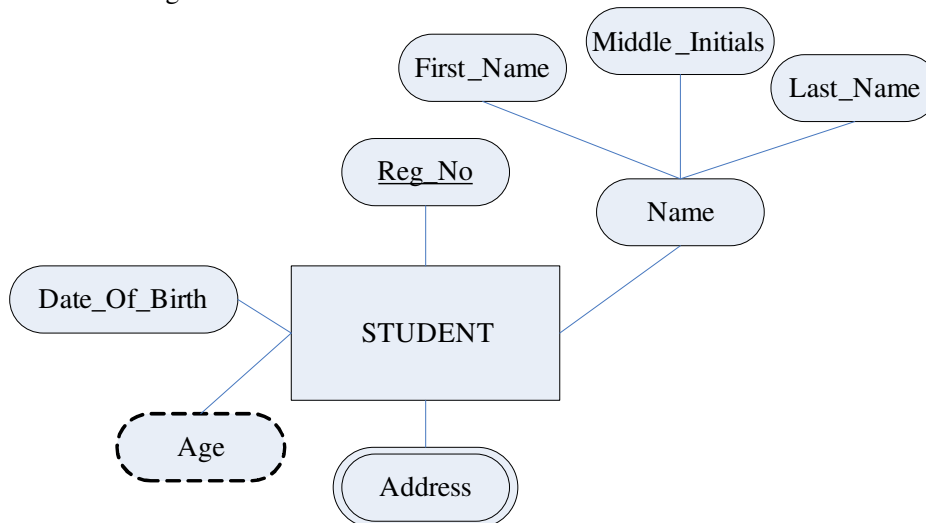
31) Which of the following is correct?

- (a) Entity CD_Track is a weak entity.
- (b) Tracks is an identifying relationship.
- (c) The participation of CD_Track in relationship Tracks is partial.
- (d) The CD_No attribute in CD is a partial key.
- (e) One Track can be part of many CDs.

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

- (a) CD(CD_No, Title, Total, Track_Number, Track_Name, Duration)
- (b) CD_Track(Track_Number, Track_Name, Duration)
- (c) CD(CD_No, Title, Total)
- (d) CD_Track(CD_No, TRACK_NO, Track_Name, Duration)
- (e) CD_Track(CD_No, Title, Total, Track_Number, Track_Name, Duration)

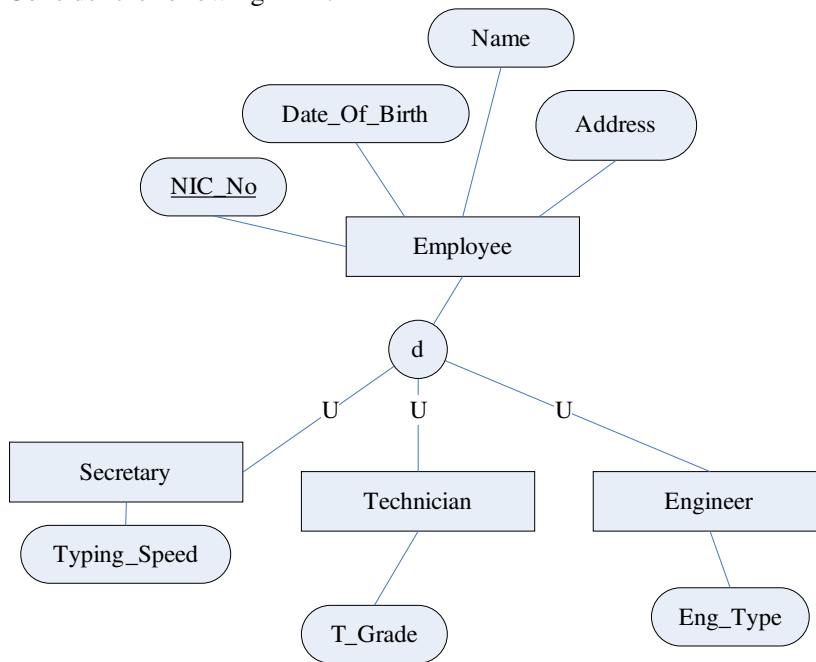
33) Consider the following ERD.



Which of the following is correct?

- (a) Age is a derived attribute.
- (b) Reg_No is a key attribute.
- (c) Address is an atomic attribute.
- (d) Address is a composite attribute.
- (e) Name is a multi-valued attribute.

34) Consider the following ERD.



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

- (a) Employee(NIC_No, Date_Of_Birth, Name, Address)
- (b) Secretary(NIC_No, Typing_Speed)
- (c) Enginner(NIC_No, Date_Of_Birth, Name, Address)
- (d) Employee(NIC_No, Date_Of_Birth, Name, Address, Typing_Speed, T_Grade, Eng_Type, Is_Secretary, Is_Technician, Is_Engineer)
- (e) Employee(NIC_No, Date_Of_Birth, Name, Address, Typing_Speed, T_Grade, Eng_Type, Type)

35) Consider the following statements.

- (i) A stored procedure is a subroutine available to applications accessing a relational database system.
- (ii) Typical uses for stored procedures include data validation (integrated into the database) or access control mechanisms.
- (iii) Stored procedures are used to consolidate and centralise logic that was originally implemented in applications.

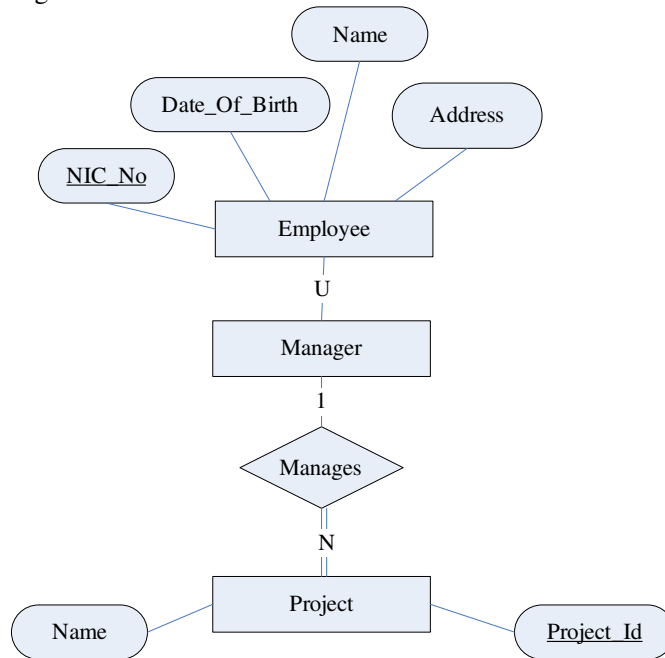
Which of the above statements is/are correct with respect to stored procedures?

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

36) Which of the following is/are correct with respect to user friendly interfaces provided by database management systems?

- (a) These interfaces present the user with a list of options called menus.
- (b) These interfaces display a set of forms to a user to insert data.
- (c) These interfaces display a schema to the user in diagrammatic form.
- (d) These interfaces can be written in English or some other language.
- (e) These interfaces can perform the same set of operations repeatedly.

37) Consider the following ERD.



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

- (a) Employee(NIC_No, Date_Of_Birth, Name, Address, Manager_NIC_No)
- (b) Manager(NIC_No)
- (c) Project(Project_Id, Name, Manager_NIC_No)
- (d) Employee(NIC_No, Date_Of_Birth, Name, Address, Type)
- (e) Project(Project_Id, Name, Manager_NIC_No, Manager_Date_Of_Birth, Manager_Name, Manager_Address)

38) Consider the following statements.

- (i) Database statements are embedded into the host programming language, but they are identified by a specific prefix.
- (ii) A library of functions is made available to the host language for database calls.
- (iii) A database programming language is not designed from scratch to be compatible with the database model and query language.

Which of the above statements is/are correct with respect to the inclusion of database interaction in application programs?

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

39) Which of the following statement(s) is/are correct?

- (a) ODBC (Open Database Connectivity) provides a way for client programs to access a wide range of databases or data sources in the server side.
- (b) Client programmes may be totally independent of server programs.
- (c) A transaction server provides an interface to which clients can send queries and receive results.
- (d) The Client machines are generally high-end mainframe computers.
- (e) The two tier client-server architecture is a good solution for distributed computing.

40) Advantages of data mining may include

- (a) more efficient use of operational databases.
- (b) automatic detection of the patterns in a database.
- (c) tools to speed up their data analyzing process.
- (d) power enabling proactive decision-making facilities.
- (e) investments to purchase data mining tools.
