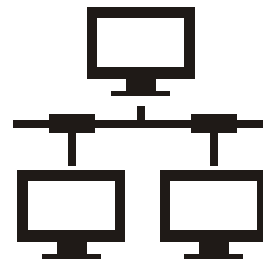


# COMPUTER SCIENCE & IT



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### **COMPUTER SCIENCE & IT**

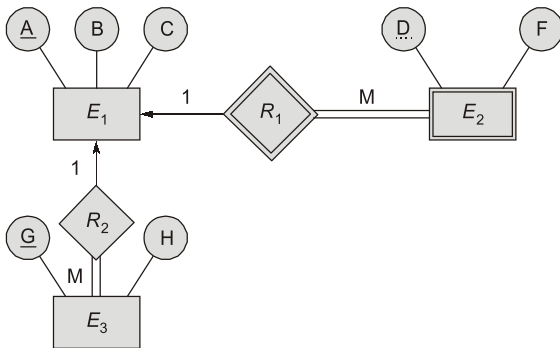
### **Databases**

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# The Relational Model

## Multiple Choice Questions & NAT Questions

1. Consider the following ER-diagram:

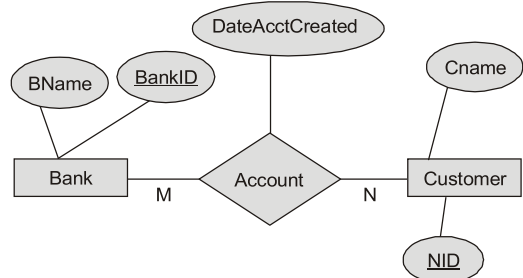


The minimum number of tables needed to represent  $E_1$ ,  $E_2$  and  $E_3$  are \_\_\_\_\_.

2. A weak entity \_\_\_\_\_.  
 (a) is an entity with no attributes beside its key.  
 (b) inherits part of its key from the 'parent' entities to which it is related.  
 (c) is an entity with no key.  
 (d) None of these.
3. In the Relational Model, the number of attributes and number of tuples in a relation are termed as \_\_\_\_\_ and \_\_\_\_\_ respectively.  
 (a) Cardinality, domain  
 (b) Degree, cardinality  
 (c) Domain, degree  
 (d) Cardinality, degree
4. An ER model of a database consists of entity types A and B. These are connected by a relationship R which does not have its own attribute. Under which one of the following conditions, can the relational table for R be merged with that of A?  
 (a) Relationship R is one-to-many and the participation of A in R is total.  
 (b) Relationship R is one-to-many and the participation of A in R is partial.

- (c) Relationship R is many-to-one and the participation of A in R is total.  
 (d) Relationship R is many-to-one and the participation of A in R is partial.

5. In an Entity-Relationship (ER) model, suppose R is a many-to-one relationship from entity set E1 to entity set E2. Assume that E1 and E2 participate totally in R and that the cardinality of E1 is greater than the cardinality of E2. Which one of the following is true about R?  
 (a) Every entity in E1 is associated with exactly one entity in E2.  
 (b) Some entity in E1 is associated with more than one entity in E2.  
 (c) Every entity in E2 is associated with exactly one entity in E1.  
 (d) Every entity in E2 is associated with at most one entity in E1.
6. Consider the following ERD diagram illustrating the relationship of customers and banks.

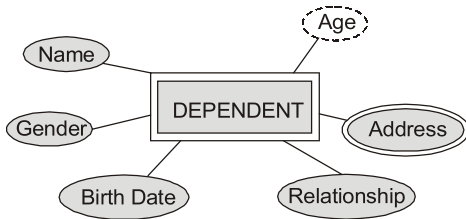


Select from among the following, candidates for relations, if the above ERD is mapped into a relational model.

- Customer(NID, CName)
- Account(DateAcctCreated, BName, CName)
- Bank(BankID, NID, BName)
- Bank(BankID, BName)
- Account(BankID, NID, DateAccCreated)

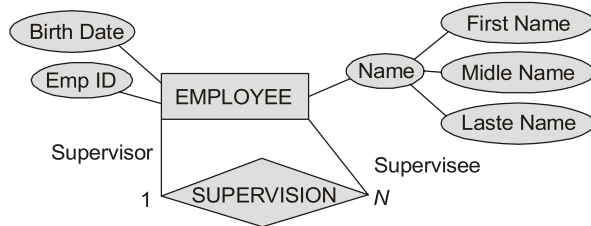
- (a) 1, 2 and 4                      (b) 1, 4 and 5  
(c) 1, 3 and 5                      (d) 1, 2 and 4

7. The following diagram represents the dependent entity from an Entity Relationship diagram.



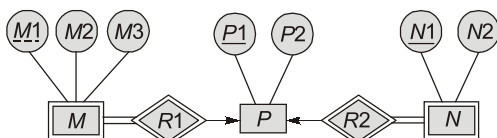
Select the characteristics which are not represented by the above diagram.

- (a) Age is a derived attribute  
(b) Gender is an atomic attribute  
(c) Address is a multivalued attribute  
(d) Name is a key attribute
8. Consider the following ERD diagram depicting the relationship of an employee and supervisor.



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

- (a) Employee (EmpID, BirthDate, Salary, Name(FirstName, MiddleName, LastName))  
(b) Supervision (EmpID, BirthDate, Salary, Name(FirstName, MiddleName, LastName), EmpID)  
(c) Supervisor (SupervisorID, BirthDate, Salary, Name(FirstName, MiddleName, LastName), EmpID, {EmpID})  
(d) Employee (EmpID, BirthDate, Salary, Name(FirstName, MiddleName, LastName), SupervisorID)
9. Consider the following ER diagram:



The minimum number of table needed to represent  $M, N, P, R1, R2$  is

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

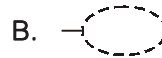
10. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I

List-II



1. Identifying relationship



2. Weak entity



3. Derived attribute



4. Multivalued attribute

Codes:

	A	B	C	D
(a)	1	3	4	2
(b)	2	4	3	1
(c)	2	3	4	1
(d)	1	4	3	2

11. Given the basic ER and relational models, which of the following is INCORRECT?

- (a) An attribute of an entity can have more than one value  
(b) An attribute of an entity can be composite  
(c) In a row of a relational table, an attribute can have more than one value  
(d) In a row of a relational table, an attribute can have exactly one value or a NULL value

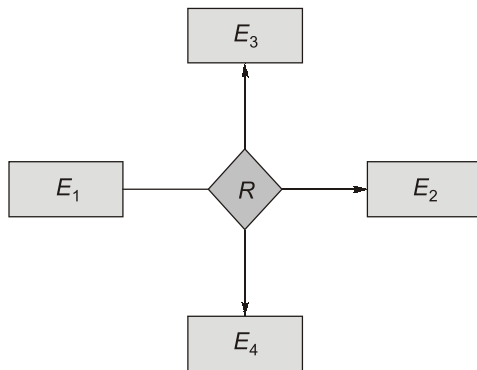
12. Consider an Entity-Relationship (ER) model in which entity sets  $E_1$  and  $E_2$  are connected by an  $m : n$  relationship  $R_{12}$ .  $E_1$  and  $E_3$  are connected by a  $1 : n$  ( $1$  on the side of  $E_1$  and  $n$  on the side of  $E_3$ ) relationship  $R_{13}$ .

$E_1$  has two single-valued attributes  $a_{11}$  and  $a_{12}$  of which  $a_{11}$  is the key attribute.  $E_2$  has two single-valued attributes  $a_{21}$  and  $a_{22}$  of which  $a_{21}$  is the key attribute.  $E_3$  has two single-valued attributes  $a_{31}$  and  $a_{32}$  of which  $a_{31}$  is the key attribute. The relationships do not have any attributes.

If a relational model is derived from the above ER model, then the minimum number of relations that would be generated if all the relations are in 3NF is \_\_\_\_\_.

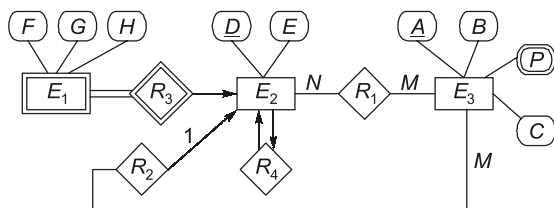
13. R is relationship with 1 : 1 cardinality, 30% participation at  $E_1$  end and 70% participation at  $E_2$  end which is the best possible design?
- $E_1$  and  $E_2$  kept separate with foreign key at  $E_1$  end
  - $E_1$  and  $E_2$  kept separate with foreign key at  $E_2$  end
  - $E_1$  and  $E_2$  kept separate with foreign key at  $E_1$  as well as  $E_2$
  - $E_1$  and  $E_2$  merges into a single table with no foreign key

14. Consider the following ER diagram with three entity sets  $E_1$ ,  $E_2$ ,  $E_3$  and relationship set  $R$



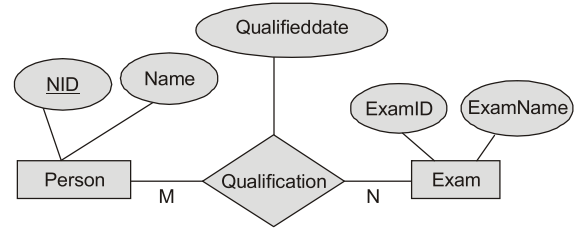
If  $E_1$ ,  $E_2$  and  $E_3$  has 50, 30, 100 and 400 records respectively. What is the maximum number of records of entities that could be in the relationship set  $R$ ?

15. Consider the following ER diagram.



The minimum number of RDBMS tables are required for the above drawn ER diagram \_\_\_\_\_ which satisfies 3NF.

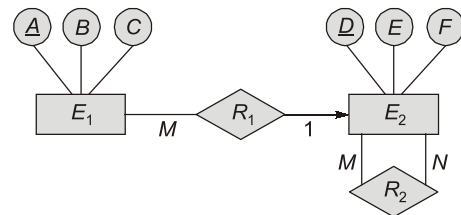
16. Consider the following Entity Relationship Diagram (ERD):



Which of the following possible relations will not hold if the above ERD is mapped into a relation model?

- Person (NID, Name)
  - Exam (ExamID, NID, ExamName)
  - Exam (ExamID, ExamName)
  - Qualification (NID, ExamID, QualifiedDate)
17. Which one of the following is used to represent the supporting many-one relationships of a weak entity set in the entity relationship diagram?
- Diamonds with double/bold border
  - Rectangles with double/bold border
  - Ovals with double/bold border
  - Ovals that contain underline identifies

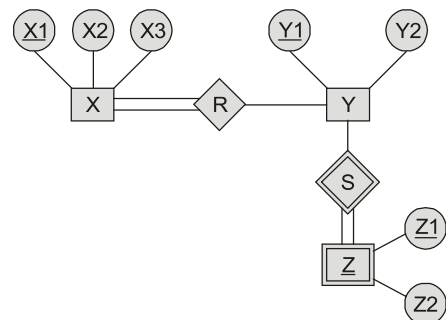
18. Consider the following ER diagram:



The minimum number of relations table required for above ER diagram are \_\_\_\_\_.

### Multiple Select Questions (MSQ)

19. Consider the following ER diagram:



Which of the following is correct when ER-diagram is converted into minimum tables?

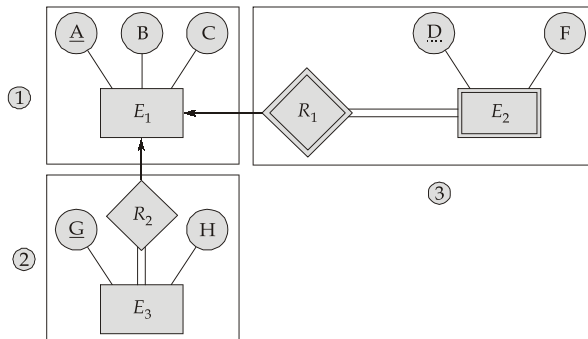
- Minimum 4 tables are required to represent X, Y, Z, R and S

**Answers The Relational Model**

1. (3)    2. (c)    3. (b)    4. (c)    5. (a)    6. (b)    7. (d)    8. (d)    9. (a)  
10. (c)    11. (c)    12. (4)    13. (b)    14. (50)    15. (5)    16. (b)    17. (a)    18. (3)  
19. (b, d)    20. (a, b, d)    21. (a, c, d)

**Explanations The Relational Model**

1. (3)



$R_1(\underline{A}, B, C, G), R_2(\underline{G}, H), R_3(\underline{D}, F, A)$   
Only 3 tables are required.

2. (c)

A weak entity is an entity which depends on some other entity and having no key.

3. (b)

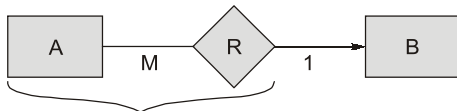
Number of attributes are called as degree while number of tuples are called as cardinality.

4. (c)

Entity sets A, B

Relationship set R

Relation R merges with that of A.

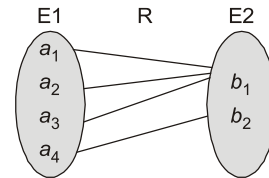


- Many to one relationship set can merge towards entity set 'A'.
- Participation towards A side can be total/ partial.

5. (a)

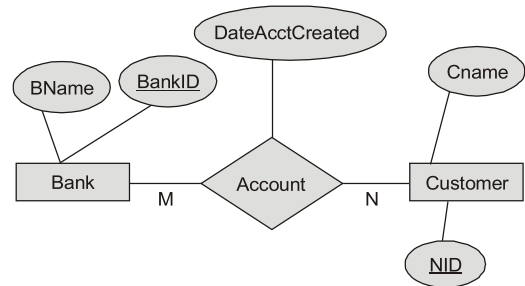


$E_1$  entries >  $E_2$  entities



Every entity in  $E_1$  is associated with exactly one entity in  $E_2$ .

6. (b)



Above ER diagram showing many to many relationship. Thus, a separate table is needed for relationship. Hence, 3 tables required i.e.,

1. Bank ( $\underline{BankID}$ ,  $BName$ )
2. Customer ( $\underline{NID}$ ,  $Cname$ )
3. Account ( $\underline{BankID}$ ,  $\underline{NID}$ ,  $DateAccCreated$ )

7. (d)

Dependent is a weak entity.

Age is a derived attribute since, inside dotted oval.

Gender is an atomic since under solid oval.

Address is multivalued attribute because it is double oval.

Name is not a key attribute since no underline.

8. (d)

The given ERD shows the self recursively relationship among Employees.

1 is supervisor 2 is supervisee.