03

ER model

1. **(4)**

Minimum number of tables required are 4.
1. Bank {Code, Ph No, Name, Addr} where code, Ph_No. is primary key.
2. Branches {Branch No, Code} where branch number or code is the primary key.
3. Bank_Branch {Addr, Branch No, Bank_Name}
4. Loan Taken {Loan No, Amount, Type, Branch_No.} where Loan No as the primary key.

Here we can not merge Branches relation and Bank Branch entity because foreign key "code" is not the candidate key of Bank entity. So, we can not combined these two.

2. **(5)**

The RDBMS tables that are need to be drawn will be:
(*i*) $E_3 R_2$ which have 'A' as its candidate key.
(*ii*) $E_2 R_4$ which have 'D' as its candidate key.
(*iii*) $E_1 R_3$ which have 'D' as its candidate key.
(*iv*) R_1 which has 'AD' as the candidate key.
(*v*) $E_3 P$; since P is a multi-valued attribute, which has 'A' as its candidate key.

3. **(50)**

For relationship set R candidate and E_1 candidate key is same because between E_1 to E_3, E_1 to E_2 and E_1 to E_4 there is one to many relationship.

4. **(5)**

$$(\underline{AC}) \begin{vmatrix} (\underline{A}B) \\ A \to B \end{vmatrix} \begin{vmatrix} (\underline{A}D) \\ \end{vmatrix} \begin{matrix} (\underline{D}E) \\ D \to E \end{matrix} \begin{vmatrix} \underline{DF} \\ \end{vmatrix}$$
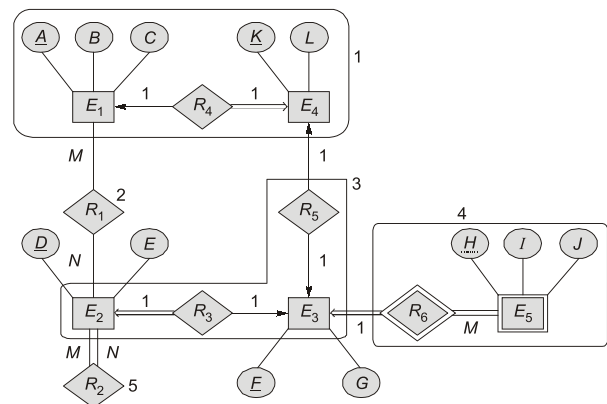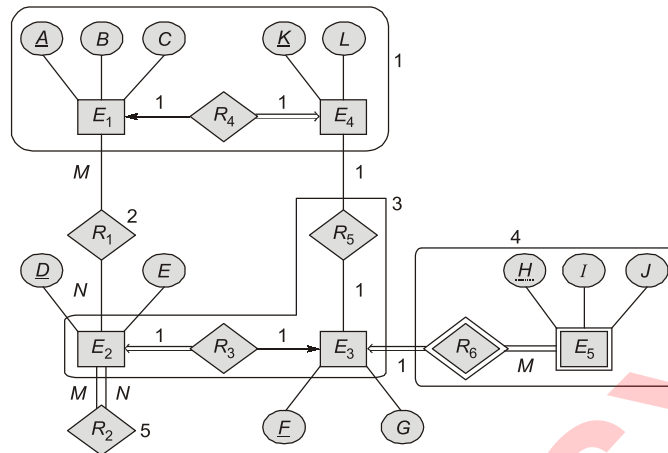
Multivalued attribute always combines with key.

5. **(2)**

Because of partial participation E_1 must separate, $E_2 R$ can merge

$$\begin{bmatrix} E_1(\underline{A}BC) & E_2 R(\underline{AD}EF) \\ A \to BC & D \to EF \\ & D \to A \end{bmatrix}$$

6. **(b)**

7. **(c)**

$E_1(\underline{A}BC)$
$R_4(\underline{A}\underline{K})$ ⎫ $E_1R_4E_4(\underline{A}BC\underline{K}L)$
$E_4(\underline{K}L)$ ⎭

$R_1(\underline{AD})$ ⎬ $R_1(\underline{AD})$

$E_2(\underline{D}E)\ R_3(\underline{DF})\ E_3(\underline{F}G)\ R_5(\underline{KF})$ ⎬ $E_2R_3E_3R_5(\underline{D}E\underline{F}\underline{K}G)$

$R_2(\underline{D_1D_2})$ ⎬ $R_2(\underline{D_1D_2})$

$R_6(\underline{FH})$ ⎫ $E_5R_6(\underline{FH}IJ)$
$E_5(HIJ)$ ⎭

8. **(4)**
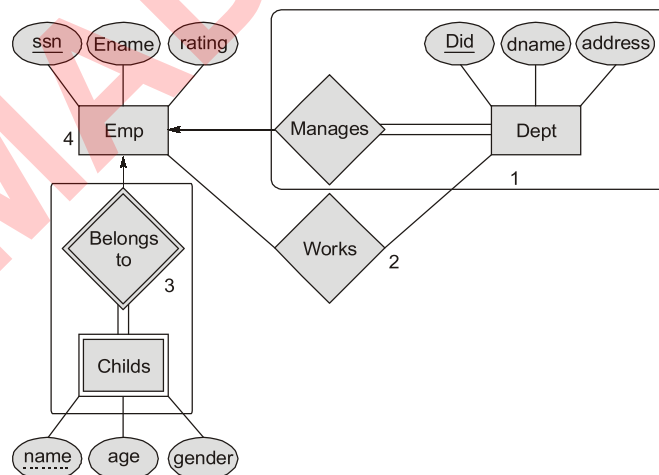
Emp (<u>ssn</u>, Ename, rating)
Dept_manages (<u>did</u>, dname, address, ssn)
Works (<u>ssn did</u>)
Childs belongs to (<u>ssn name</u>, age, gender)

9.   **(4)**
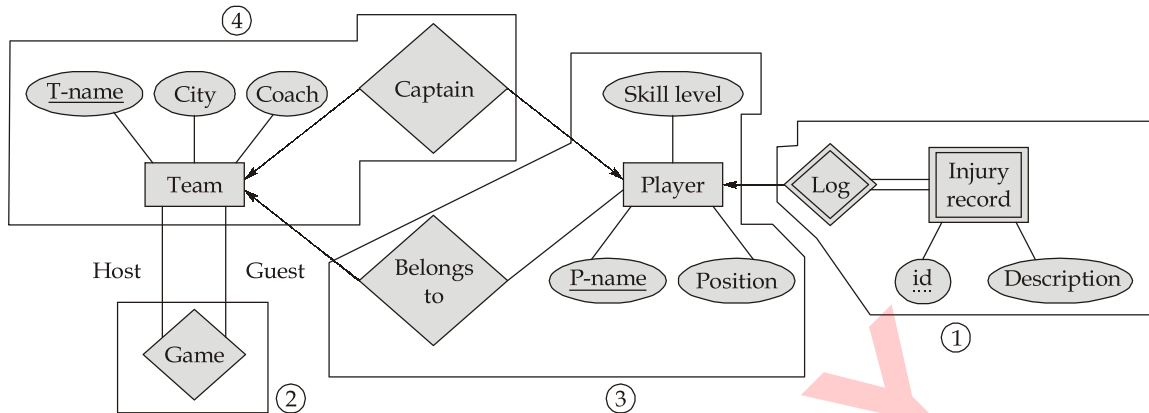
So, minimum 4 tables are required.

10.   **(b)**

A student can enroll one or more course.

A course can be enrolled by one or more students.

Option (b) is correct. It is a many to many relation with total participation at one end.

11.   **(c)**

Every object of E_1 must relate with atleast one entry of E_2.

12.   **(d)**

The resulting of any unknown value AND with a false value will always return in false value. Because the result of AND operation will be true only when both values are true and is unknown only when atleast one value is true.

13.   **(c)**

Entity E_1 and E_2 can be merged together while E_3 is present in a separate relation. Thus, the total number of relations required are 2. C will be prime attribute of relation E_1.

14.   **(d)**

As we know that A → B determines that A can uniquely identify B and B → A determines that B can uniquely identify A, thus it is a one-to-one relationship.

15.   **(c)**

- We want to avoid data duplication and consequent possible in consistencies caused by duplicating the key of strong entities.
- Weak entities affect the logical structure of an entity as it is dependent on another entity.

16.   **(c)**

Here, both the statements are true because weak entities are dependent on the strong entities, thus, weak entities are deleted automatically on the deletion of its strong entity. Also they are physically stored together.

17. (d)

We know that N number of cities could be part of a single country can have N number of cities, therefore, the correct cardinality ratio for cities: countries will be N : 1.

18. (3)

Table 1 → "branches-bankbranch-taken-loan"
Table → "Bank_"
Table 3 → "Ph_No" is a multivalued attribute. So, require separate table.
Hence, minimum number of tables required = 3.

19. (b)

Atleast one multivalued attribute implies that there will be atleast two relations in relational model.
Candidate key for relations having multivalued attribute will be ⇒ candidate key of E + multivalued attribute itself. On assuming that E has only single attribute as candidate key then relational model will have only one simple candidate key.

20. (5)

Total 5 foreign keys will be there in the relational model of above ER diagram.

21. (b)

Minimum 3 relations are required for A, B and C respectively. Since, the relationship between them is one-to-many or many-to-one so, we don't need any extra relation and we can put the relationship attribute on many side.
Relation A may have primary key of the relation C as primary key. This statement is wrong because primary key of relation C may become the foreign key of the relation A but not the primary key of relation A.

22. (4)

- For self referential many to many relationship R_1 of entity E_1, 2 separate relations are required.
- For one-one both side partial relationship R_2, both Entity E_1 and E_3 will have separate relation.
- Entity E_2 could be merged with entity E_3 due to many to many relationships with both side total participation.
- Entity E_4 will have a separate relation due to one-to-many relationship with both entity E_3 and E_2.

Thus, the total number of relations will be 4.

■■■■