Branch : CSE & IT Batch : Hinglish

DBMS

FD's & Normalization

DPP 03

[MCQ]

1. Consider the relation R (P, Q, R, S, T) and the set of function dependencies F = {P →Q, QR →T, TS→P}. Which of the following is not the candidate key of R?

(a) RST (b) PRS
(c) QRS (d) PQR

[NAT]

2. Assume a relation R (P, Q, R, S, T) with the set of functional dependencies {P→Q, Q→R, R→Q and Q→T}. How many candidate keys are possible in R?

[MCQ]

3. Consider the following statements:

S_1: A key in DBMS is an attribute (or) a set of attributes that help to uniquely identify a tuple (or row) in a relation (or table).

S_2: There should be only one candidate key in relation, which is chosen as the primary key.

(a) Only S_1 is true.
(b) Only S_2 is true.
(c) Both S_1 and S_2 are true.
(d) Neither S_1 nor S_2 is true.

[MSQ]

4. Choose the correct statements from the following:

(a) Then minimal set of attributes that can uniquely identify tuple is known as a candidate key.
(b) A super key is a group of single or multiple keys that identifies rows in a table. It supports NULL values.
(c) Primary key is not a unique key.
(d) None of the above.

[MSQ]

5. Consider a schema with attributes A, B, C, D & E following set of functional dependencies are given,

A→B
A→C
CD→E
B→D
E→A

Which of the following functional dependencies is implied by the above set?

(a) CD→AC (b) BC→CD
(c) AC→BC (d) BD→CD

[MCQ]

6. Assume the relation R that has eight attributes ABCDEFGH. Let A = {CH→G, A→BC, B→CFH, E→A, F→EG} is a set of functional dependencies (FD). How many candidates key does the relation R have? _____.

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

[MCQ]

7. Assume the relation schema R (P, Q, R, S, T, U, V, W, X, Y) and the set of functional dependencies on R:
F = {PQ→R, Q→UV, PT→WX, W→Y, X→Z}.
Which of the following can be candidate key for R?

(a) PQU (b) PQT
(b) PQTR (d) PQTWX

[MCQ]

8. Consider the following statements:

S_1: Primary key has no duplicate values it has only unique values.

S_2: Primary key may consist of a single column or multiple columns according to data sets.

(a) Only S1 is true.
(b) Only S2 is true.
(c) Both S1 & S2 are true.
(d) Neither S1 nor S2 are true.

[MSQ]

9. Choose the correct statements about candidate key.

(a) Candidate key is a super key with maximum attributes.

(b) It must contain unique values.

(c) A table can have multiple CK's but at most one primary key.

(d) It is a minimal super key with no repeated data.

Answer Key

1. **(d)**
2. **(1)**
3. **(a)**
4. **(a, b)**
5. **(a, b, c)**
6. **(c)**
7. **(b)**
8. **(c)**
9. **(b, c, d)**

Hints & Solutions

1. (d)

RS is not present in RHS of all the FD's therefore RS must be the part of candidate key. So, using option elimination, option (d) is eliminated because PQR does not contain RS therefore it cannot be a candidate key, hence option "d" is the answer.

2. (1)

P→Q
Q→R
R→Q
Q→T
So $\{PS\}^+ = \{P\ Q\ R\ S\ T\}$ so PS is candidate key.
Only PS is candidate key, hence 1 is the answer.

3. (a)

S1: True: A key in DBMS is an attribute (or) a set of attributes that help to uniquely identify a tuple (or row) in a relation (or table).

S2: False: There can be more than one candidate key in relation out of which one can be chosen as primary key.

4. (a, b)

(a) Candidate key: It is a minimal set of attributes that can uniquely identify a tuple is known as candidate key.
Example: Passport_No, Employee_ID, Roll_No

(b) Super key: Super key is an attribute (or set of attributes) that is used to uniquely identify all attributes in a relation. It need not be minimal.

Note: The difference between Super key and a Primary key is as follows:
(i) Super key's attributes can contain NULL.
(ii) Primary key is a minimal super key hence all super keys can't be primary key.

(c) Primary key is a unique key.

5. (a, b, c)

Find the closure set of left side of each FD of every option given. If the closure set of left side contains the right side of the FD, then the particular FD is implied by the given set.

(a) Closure of CD = ABCDE, Therefore CD→AC can be derived from the given set of FD's.

(b) Closure of BC = ABCDE, therefore BC→CD can be derived from the given set of FD's.

(c) Closure of AC = ABCDE, therefore AC→ BC can be derived from the given set of FD's

(d) Closure of BD = BD, therefore BD→CD can't be derived from the given set of FD's.

6. (c)

NOTE: If closure of any attribute includes all the attributes of a table then it is a superkey and minimal superkey is called a candidate key, find closure of each attribute set. D cannot be derived using the left side of FD. hence, D will definitely be part of the candidate key.

$\mathbf{AD}^+$ = ABCDEFGH
$\mathbf{BD}^+$ = ABCDEFGH
$CD^+ = CD$
$D^+ = D$
$\mathbf{ED}^+$ = ABCDEFGH
$\mathbf{FD}^+$ = ABCDEFGH
$GD^+ = GD$
$HD^+ = HD$
Thus, there are 4 candidates keys AD, BD, ED and FD.

7. (b)

Simply find the closure of all the options given, as we can see PQT cannot be derived from any of the above FD's which states that P, Q & T must be present in the key. Hence, we need to verify only b, c & d by taking closure set PQT^+ derives all attributes in relation R. so it is candidate key.

NOTE: option (c) & (d) are the super keys, since adding zero or more attributes to C.K generates super key.

8. (c)

- Primary key has no duplicate values it has only unique values. Hence S_1 is true.
- When a single column can have repeated values then to identify the records sets uniquely, we have to combine multiple columns to form compound Candidate key and that Candidate key may be the Primary key. Hence, Statement S_2 is True.

9. (b, c, d)

(a) candidate key is super key with minimal attributes.