Branch : CSE & IT Batch : Hinglish

WEEKLY TEST – 01
Database Management System

Maximum Marks 15

Q.1 to 5 Carry ONE Mark Each

[NAT]

1. From the given below characteristics, choose the number of characteristics of a primary key:

I. Minimal attribute
II. Unique
III. Non-Null
IV. Null
V. Duplicate values

[MSQ]

2. Choose the correct statement from the following.

(a) A functional dependency X $\rightarrow$Y is trivial functional dependency if y is a subset of x.

(b) A functional dependency X $\rightarrow$ Y is trivial functional dependency if y is a proper superset of X.

(c) A functional dependency X $\rightarrow$ Y is called non-trivial functional dependency if Y is not a subset of X.

(d) A functional dependency X $\rightarrow$ Y is called non-trivial functional dependency if Y is proper subset of X.

[MCQ]

3. The candidate key other than primary key is called an _____.

(a) Super key (b) Foreign key
(c) Alternate key (d) None

[MCQ]

4. Choose the correct statement from the following regarding a composite key:

(a) Any key such as primary key, candidate key can be called composite key if it has more than one attribute.

(b) A super key can be called as a composite key if it has more than one attribute.

(c) A key that has more than one attribute is known as composite key.

(d) All the statement are true.

[MSQ]

5. Given a relation R (X, Y, Z, W, U, V) with (X, Z) and {W, U, V} as the only candidate keys, then choose the super keys for the given relation.

(a) {X, Z} (b) {X, Z, U}
(c) {X, Y} (d) {W, U, V}

Q.6 to 10 Carry TWO Marks Each

[NAT]

6. Given the following FD set over a relation R (A, B, C, D, E, F, G, H, I)

{A$\rightarrow$ DE, D $\rightarrow$ BCE, B $\rightarrow$ AFI, AH $\rightarrow$ GI}

The number of non-prime attributes for the above FD set is/are?

[MCQ]

7. Consider a relation R (P, Q, R, S, T, U) with the following functional dependencies:

PQ $\rightarrow$ R, S $\rightarrow$ TU, R $\rightarrow$ P, QT $\rightarrow$ R, QR $\rightarrow$ S, RU $\rightarrow$ QS, PRS $\rightarrow$ Q, RT $\rightarrow$ PU

Which of the following is/are true?

(a) The closure of QR is {P S T U}
(b) All attributes present in R are in the closure of QR
(c) QR is the only candidate key of R
(d) PQR is a key of R

[NAT]

8. Find the number of candidate keys possible for the given functional dependency set on relation

R (p, q, r, s, t, u, v)

{p $\rightarrow$ qr, r $\rightarrow$ st, s $\rightarrow$ quvp}

[MCQ]

9. Consider a relation R(P, Q, R, S, T) and the set of functional dependency set {P $\rightarrow$ ST, S $\rightarrow$ Q, and T $\rightarrow$ R} if we project R (and therefore its FD sets onto schema R_1 (P, Q, R). Then choose the correct option in the following?

(a) Only PQR is a Candidate key
(b) Only P is key
(c) Only ST is a key
(d) None of the above

[MSQ]

10. Consider relation R (P, Q, R, S, T, U) with following functional dependencies:

(i) P $\rightarrow$ Q (ii) RS $\rightarrow$ T
(iii) T $\rightarrow$ P (iv) Q $\rightarrow$ S

How many candidate keys does R have? _____.

Answer Key

1. **(3)**
2. **(a, c)**
3. **(c)**
4. **(d)**
5. **(a, b, d)**
6. **(5)**
7. **(b)**
8. **(3)**
9. **(b)**
10. **(4)**

Hints and Solutions

1. (3)

A primary key is a minimal set of attributes, that uniquely identify a tuple in a relation

A primary key is minimal, unique and allows no null values

2. (a, c)

A trivial functional dependency is of the form $X \rightarrow Y$ where $Y \subseteq X$

A non-trivial functional dependency is of the form $X \rightarrow Y$ where $Y \cap X = \phi$ or $Y \not\subset X$.

3. (c)

The candidate key other than the primary key is called an alternate key.

Example:

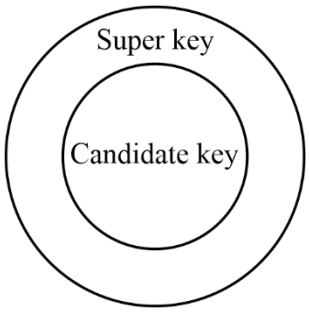
EMP_ID as well as EMP_PHNO both are candidate key for relation student but EMP_PHNO will be an alternate key.

4. (d)

Any key such as a primary key, candidate key, or super key can be called composite key if it has more than one attribute.

5. (a, b, d)

Every candidate key is a super key



As already mentioned in the question, there exists only 2 candidate keys for the given relation i.e. {X, Z} and {WUV}, then the super keys will be a combination of candidate key + other non-prime attributes.

So super keys are {X, Z}, {W, U, V}, and {X, Z, U}.

6. (5)

There exists 3 candidate keys for the given FD set:

A^+ = {A, D, E, B, C, F, I} × not candidate key

AH^+ = {A, D, E, B, C, F, I, H, G} ✓ candidate key

BH^+ = {B, A, F, I, D, E, H, G, C} ✓ candidate key

DH^+ = {D, H, B, C, E, A, F, I, G} ✓ candidate key

Prime attribute = {A, B, D, H} = 4

So, non-prime attributes are 9 – 4 = 5.

7. (b)

(a) False, the closure of QR contains all the attributes.

(b) True, since QR^+ contains all the attributes. Therefore, it is candidate key of R.

(c) False, PQ is also a candidate key.

(d) False, since PQ is candidate key of R. Therefore, PQR is super key of R.

8. (3)

Candidate key's p^+ = {p, q, r, s, t, u, v}

s^+ = {s, q, u, v, p, r, t}

r^+ = {r, s, t, q, u, v, p}

$qtuv^+$ = {q, t, u, v} ×

Only 3 candidate key's possible.

9. (b)

P is not present in RHS of any FD. So P must be the part of a candidate key. So we check/validate it from taking closure of $P(P^+)$.

P^+ = {P, Q, R, S, T}

Closure of P contain all the attributes of the relation thus P is the only key

Hence option (b) is correct.

10. (4)

$P \rightarrow Q$

$RS \rightarrow T$

$T \rightarrow P$

$Q \rightarrow S$

$(P\ R\ U)^+ = \{P, Q, R, S, T\ U\}$

$(Q\ R\ U)^+ = \{P, Q, R, S, T\ U\}$

$(S\ R\ U)^+ = \{P, Q, R, S, T\ U\}$

$(T\ R\ U)^+ = \{P, Q, R, S, T\ U\}$

Hence there are 4 candidate keys