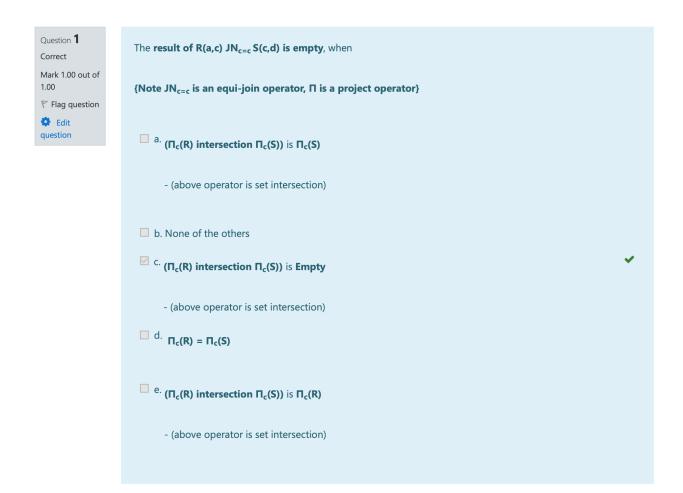
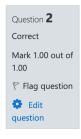
### Quiz 3



### **Correct Answer : Option C**

### **Explanation:**

- a.  $(\Pi c(R) \cap \Pi c(S))$  is  $\Pi c(S)$ : This implies that the set of c values in R is a subset of the set of c values in S. Since there's an intersection, it means there are some common values in c between R and S. Hence, the join on c would not be empty.
- c.  $(\Pi c(R) \cap \Pi c(S))$  is Empty: If the intersection of the projected c values from R and S is empty, it means there are no common c values between R and S. Therefore, an equi-join on c would indeed result in an empty set.
- d.  $\Pi$ c(R) =  $\Pi$ c(S): This means the sets of c values in both R and S are identical. An equi-join on c would therefore not be empty, as all c values in R can be paired with c values in S.
- e.  $(\Pi c(R) \cap \Pi c(S))$  is  $\Pi c(R)$ : This implies that the set of c values in S is a subset of the set of c values in R. Like in option a, there are common values in c between R and S, so the join would not be empty.



Consider R(K, A) having at least ten rows, with K as the key attribute and attribute A is a positive integer, the result of $\Pi_{(K,A)} \left[ R(K,A) \ J N_{A>A} \ R(K,A) \right]$
{Note $JN_{A>A}$ is a theta join operator. $\Pi$ is the project operator. $\Pi_{(K, A)}$ takes the K, A attributes of the left hand side relation of the $JN_{A>A}$ operator}.
Select one or more;
a. Can be the relation R(K,A)
b. Number of rows in (Π <sub>(K,A)</sub> (R(K,A) JN <sub>A&gt;A</sub> R(K,A)))
is always greater than  number of rows of R(K,A)
☐ c. None of the others
☑ d. Can be empty.
e. Number of rows in Π <sub>(K.A)</sub> (R(K,A) JN <sub>A&gt;A</sub> R(K,A)) can be
(number of rows of R(K,A) * number of rows of R(K,A))

## **Correct Answer : Option D Explanation:**

a. The row with smallest value of attribute A in left hand relation R(K, A) will not join with any row on the right side since the join condition  $(R(K, A) \bowtie_{A>A} R(K, A))$  is going to fail. Thus the row will never projected in the result of

$$\pi_{K,A}\left(R(K,A)\bowtie_{A>A}R(K,A)\right)$$

b. Consider the relation R(K, A) as below

K	A
1	10
2	10
3	10

Since every attribute of A is same after the result of join operation  $(R(K, A) \bowtie_{A>A} R(K, A))$  is empty and thus  $\pi_{K,A}(R(K, A) \bowtie_{A>A} R(K, A))$  is also empty . Therefore zero rows in result. Therefore number of rows is not always greater than number of rows in R(K, A)

- d. Can be empty is possible as shown above.
- e. For this to happen. Every row of the left hand relation must be joined with every row of right hand relation, which is not possible for the given join condition  $(R(K, A) \bowtie_{A>A} R(K, A))$ . As explained in option a the lowest element of attribute A on LHS will not join to any element in RHS.

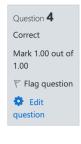


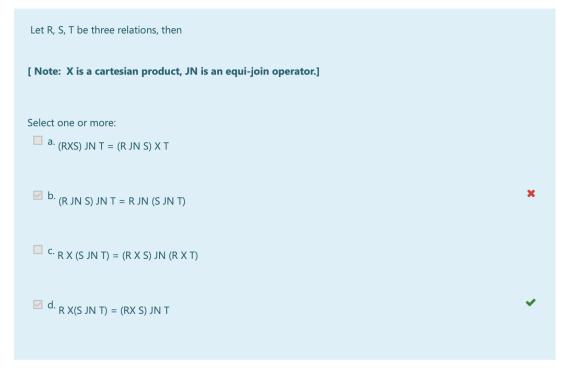
# Correct Answer: Option b,c,d Explanation:

- a. Each row of R(A) is repeated twice in bag union thus  $R(A) \neq R(A) \uplus R(A)$
- b. An element appears in the intersection of two bags the minimum of the number of times it appears in either.

Therefore 
$$R(A) = R(A) \cap_B R(A)$$

- c. set difference of two equal relations is empty since you're effectively asking for the set of elements that are in  $\Pi A(R(A))$  but not in  $\Pi A(R(A))$
- d. Similarly bag difference of two equal relations is empty.

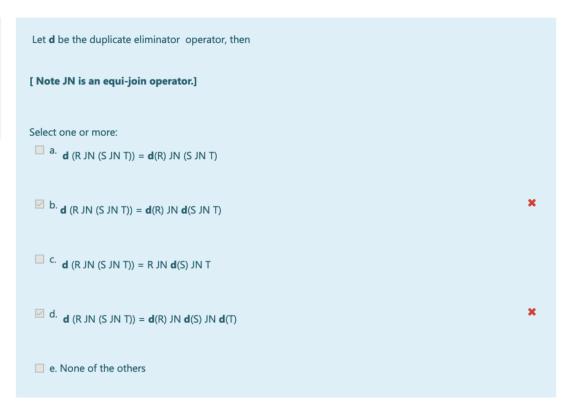




#### Correct Answer: option b,d

- a. cartesian product and equi join operator cannot be swapped with each other (R JN S) X T has every tuple of T since we are doing cartesian product with T whereas (RXS) JN T joins only selected tuples of T based on equi join condition.
- b. The equivalence of the join operations (R JN S) JN T and R JN (S JN T) is upheld due to the associativity property of join operations in relational algebra. This holds true under the condition that the join operations between R and S, as well as between S and T, are based on independent attributes
- c. RHS has more attributes than LHS which fails the case
- d. True, The join condition applied in the equi-join operation is the same in both cases, and it only involves attributes from S and T. Therefore, whether the join is performed before or after the Cartesian product with R does not affect the outcome. R is effectively 'independent' in this context as it does not influence the join condition between S and T.





# Correct Answer: b,d Explanation:

R

Α	В
1	3
2	4
3	4

S

В	С
3	4
4	5
5	6

Τ

С	D
4	5
4	5
5	6

S JN T

В	С	D
3	4	5
3	4	5
4	5	6

R JN (S JN T)

Α	В	С	D
1	3	4	5
1	3	4	5
3	4	5	6

d (R JN (S JN T))

A	В	С	D
1	3	4	5
3	4	5	6

In the choosen relations, note that d(R) = R and d(S)

Consider ,the relations as below,

- a. As we can see from above relations, d (R JN (S JN T)) not same as d(R) JN (S JN T)
- b. This is true as it will not generate any duplicate rows as we are equi joining two relations without duplicates in them.
- c. Same explanation as option a , in our example we can observe d(R)=R and d(S)=S. Thus this option is not correct.
- d. This is true similar to option b by equi joining relations without duplicates we will not observe duplicates in result.