Relations - Class XI

Related Questions with Solutions

Questions

Quetion: 01

In the set $A = \{1, 2, 3, 4, 5\}$, a relation R is defined by $R = \{(x, y) | x, y \in A$ and $x < y\}$. Then R is,
A. Reflexive
B. Symmetric
C. Transitive
D. None of these

Quetion: 02

Let $x = \{1, 2, 3, 4\}$ and $Y = \{1, 3, 5, 7, 9\}$. Which of the following is relations from x to Y -
A. $R_1 = \{(x, y)/y = 2 + x, x \in X, y \in Y\}$
B. $R_2 = \{(1, 1), (2, 1), (3, 3), (4, 3), (5, 5)\}$
C. $R_3 = \{(1, 1), (1, 3), (3, 5), (3, 7), (5, 7)\}$
D. $R_4 = \{(1, 3), (2, 5), (2, 4), (7, 9)\}$

Quetion: 03

If $A = \{1, 2, 3\}, B = \{1, 4, 6, 9\}$ and R is a relation from A to B defined by ' x is greater than y'. Then range of R is-
A. $\{1, 4, 6, 9\}$
B. $\{4, 6, 9\}$
C. {1}
D. none of these

Quetion: 04

Given the relation $R = \{(1, 2), (2, 3)\}$ on the set $A = \{1, 2, 3\}$, the minimum number of ordered pairs which when added to R it an equivalence relation is-
A. 5
B. 6
C. 7
D. 8

Quetion: 05

Let $R = \{(1, 3), (4, 2), (2, 4), (2, 3), (3, 1)\}$ be a relation on the set $A = \{1, 2, 3, 4\}$. The relation is-
A. transitive
B. not symmetric
C. reflexive
D. a function

Solutions

Solution: 01

Q A = {1, 2, 3, 4, 5}
- R = {[x, y] | x, y ∈ A and x < y}
- R = {[1, 2], [1, 3], [1, 4], [1, 5], [2, 3], [2, 4], [2, 5], [3, 4], [3, 5], [4, 5]

Q [1, 1] ∉ R
So, relation R is not Reflexive
Q [1, 2] ∈ R while, [2, 1] ∉ R
So, given relation R is not symmetric.
Q [1, 2], [2, 3] ∈ R
∴ [1, 3] ∈ R
Similarly, for other Combinations
So, given relation R is Transitive.

Solution: 02

Q x = {1, 2, 3, 4}
y = {1, 3, 5, 7, 9}
Q [5, 5] $\subseteq R_2$
While, 5 $\notin$ X
So, R_2 is not a relation from X to Y.
Q [5, 7] $\in R_3$
While, 5 $\notin$ X
So, R_3 is not a relation from X to Y.
Q [7, 9] $\subseteq R_4$
While 7 $\notin$ X
So, R_4 is not a relation from X to Y.

Solution: 03

$\therefore$ A = {1, 2, 3}
B = {1, 4, 6, 9}
R = {[2, 1], [3, 1]}
$\therefore$ Range of R = {1}

Solution: 04

Q A = {1, 2, 3}
$\therefore$ A × A = {[1, 1], [1, 2], [1, 3], [2, 1], [2, 2], [2, 3], [3, 1], [3, 2], [3, 3]}
For Reflexive
At least, [1, 1], [2, 2], [3, 3] $\subseteq$ R
For symmetric,
If [1, 2] $\subseteq$ R
Then [2, 1] Should be in R.
Similarly, for [2, 3] $\subseteq$ R,
Then [3, 2] should be in R.
For Transitive
If [1, 2], [2, 3] $\subseteq$ R,
Then [1, 3] should be in R.
For equivalence relation.
[1, 1], [2, 2], [3, 3],
[1, 2], [2, 1]
[2, 3], [3, 2]
[1, 3], [3, 1]
So, the minimum no of ordered pairs which when added to R to make it an equivalence relation = 9– 2 = 7

Solution: 05

Given R = {[1, 3], [4, 2], [2, 4], [2, 3], [3, 1]} be a relation on the set A = {1, 2, 3, 4}.
[A] Since, [1, 3] $\subseteq$ R and [3, 1] $\subseteq$ R but [1, 1] $\notin$ R. So, R is not transitive.
[B] Since, [2, 3] $\subseteq$ R but [3, 2] $\notin$ R. So, R is not Symmetric.
[C] Since, [1, 1], [2, 2], [3, 3], [4, 4] $\notin$ R. So, R is not reflexive.
[D] Since, [2, 4] $\subseteq$ R and [2, 3] $\subseteq$ R So, R is not a function

Correct Options

Answer:01
Correct Options: C
Answer:02
Correct Options: D
Answer:03
Correct Options: C
Answer:04
Correct Options: C
Answer:05
Correct Options: B