CS & IT



ENGINERING

Discussion notes

Discrete Mathematics
Set Theory

DPP 06



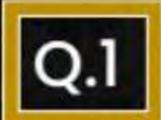
SATISH YADAV SIR



TOPICS TO BE COVERED

01 Question

02 Discussion



1R132

Consider the following statement about relations on a set A, where | A | = n.

How many of the following statements are TRUE?

[NAT]



I. If R is a relation on A and $|R| \ge n$, then R is reflexive. (false)

II. If R_1 , R_2 are relations on A and $R_2 \supseteq R_1$, then R_1 is reflexive $\Rightarrow R_2$ is reflexive \top

III. If R_1 , R_2 are relations on A and $R_2 \supseteq R_1$, then R_1 is transitive $\Rightarrow R_2$ is $(f_{A_1} \bowtie f_{A_2})$ transitive

IV. If R_1 , R_2 are relations on A and $R_2 \supseteq R_1$, then R_2 is symmetric $\Rightarrow R_2$ is f(x) = 1 symmetric

If R is an equivalence relation A, then $n \le |R| \le n^2 \left(\frac{7}{4} \right)$

$$T \cdot |A| = 2$$
 $R = \{(12)(21)\}$
 $R = \{(12)(21)$



Consider $A = \{w, x, y, z\}$, then which of the following options [MSQ] is/are correct for the given set?





The number of symmetric relations is 2^{10} 2^{10} 2^{10} 2^{10} 2^{10} 2^{10}







The number of relations which is anti-symmetric and contain

$$(x, y)$$
 is $2^4 \cdot 3^5$

$$(x, y)$$
 is $2^4 \cdot 3^5$ $2^5 \cdot 3^{-1} \cdot 3^{-1}$



The number of relations which is reflexive, symmetric and anti-

symmetric is 1



Let A be a set with |A| = n, and let R be a relation on A that is antisymmetric, then which of the following option is correct?





The maximum value for |R| is $(n^2 + n)/2$.





The number of anti-symmetric relations have size |R| is $2^{(n^2+n)/2}$



Both a and b

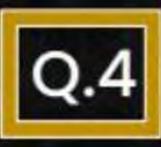
$$\frac{n^2-n}{n^2}$$

None of these.

$$N+U\frac{5}{5}U$$

 $2^{\frac{n^2-n}{2}}$

 $\frac{11}{n} \frac{233}{12} \frac{33}{233}$



Let A be a set with |A| = n, and let R be an equivalence relation on A with |R| = r. Which of the following is TURE for the given [MCQ]



$$r - n$$
 will be always even. 7)

$$A = N$$
 $|R| = R$ $|R| = R$ $|R| = R$ $|R| = \{(1)(22)$

$$R_{2} = \left\{ \frac{(11)(22)(33)(12)(21)}{n} + 2 \right\}$$

$$(3+2)-3=2$$

$$(3+2)-3=2$$

$$(3+2)-3=2$$

$$(3+2)-3=2$$

$$(3+2)-3=2$$

$$(3+2)-3=2$$

Q.5

Let A = {1, 2, 3, 4, 5, 6, 7, 8}. How many symmetric relations on A contain exactly four ordered pairs?



8 same elements.

$$\frac{n^2-n}{2} = \frac{64-8}{2} = \frac{56}{2} = 28 \text{ boxes}$$

$$\frac{28}{28} = \frac{8}{28} = \frac{28}{28} = \frac{28}{28} = \frac{1232}{28} = \frac{1232}{2$$



