CS & IT ENGINEERING

Discrete Mathematics

Set Theory

DPP 07 Discussion notes

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01 Question

02 Discussion

Q.1 Which of the following pairs of elements are comparable in the poset $(N, |)$ where N is set of all integers. [MCQ]

A. 6, 7 ✗

B. 3, 5 ✗

C. 5, 15 ✓ $5 \mid 15$ OR $15 \mid 5$

D. 4, 6

Q.2 Which of the following pairs of sets are not comparable in the poset $[P(A), \subseteq]$ where [MCQ]

$A = \{0, 1, 2\}$

A. $\{0\}, \{0, 1\}$ $\{0\} \subseteq \{0,1\}$ ✓

B. $\phi, \{0, 1, 2\}$ $\phi \subseteq \{0,1,2\}$ ✓

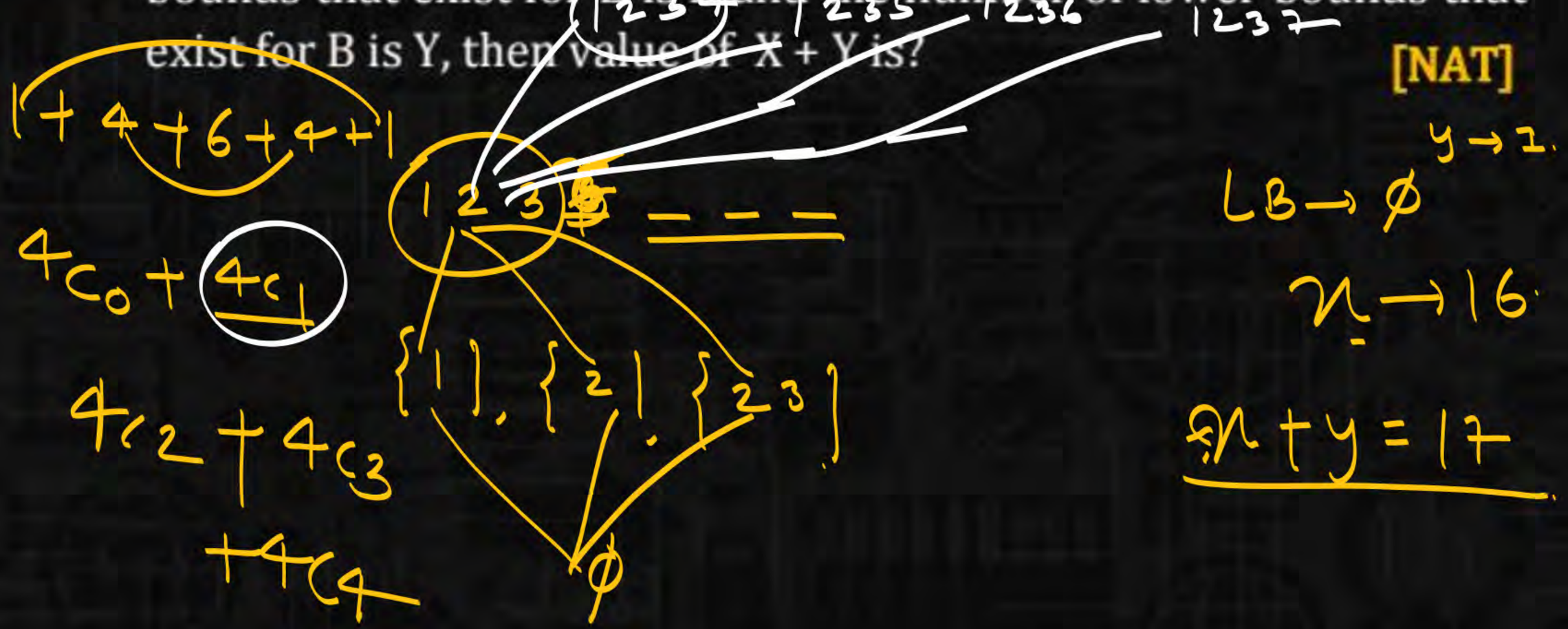
C. $\{1, 2\}\ \{0, 1, 2\}$ $\{1,2\} \subseteq \{0,1,2\}$ ✓

D. $\{0\}, \{1\}$ ✓

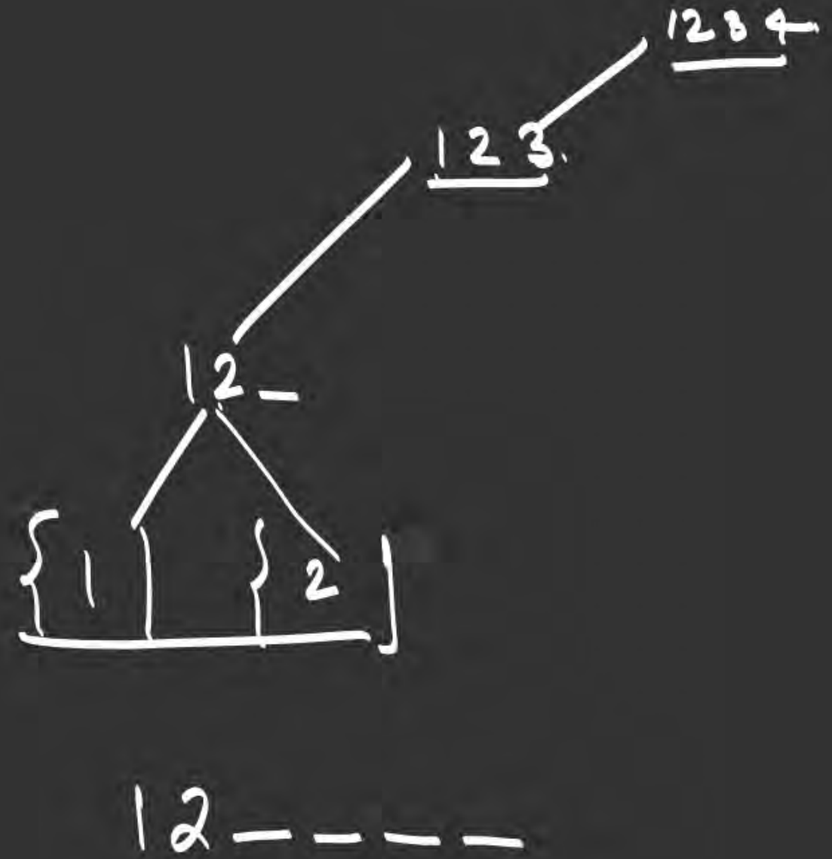
Q.3

Let $U = \{1,2,3,4,5,6,7\}$, with $A = P(U)$, and let R be the subset relation on A. For $B = \{\{1\},\{2\},\{2,3\}\} \subseteq A$, then the number of upper bounds that exist for B is X and the number of lower bounds that exist for B is Y, then value of X + Y is?

[NAT]




123
12
13
23
1
2
3
ϕ


1234
123
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1
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12----

Q.4 Let $(A, R_1), (B, R_2)$ be two posets. On A × B, define relation R by $(a,b)\,R\,(x,y)$ if $a\,R_1 x$ and $b\,R_2 y$. Consider the following statement: [MCQ]

I. R is a partial order.

II. R is not a partial order.

A. Only I is true.

B. Only II is true.

C. Both I and II are true.

D. Neither I nor II is true.

(A, R_1) (B, R_2)

$(a,b)\,R\,(x,y)$

$a R_1 x \wedge b R_2 y$

$(a,b) R (a,b)$ $a R_1 a \wedge b R_2 b$ ✓

$(a,b) R (c,d) \wedge (c,d) R (a,b) \rightarrow ab = cd$.

$\frac{a R_1 c}{b R_2 a}$ $\frac{c R_1 a}{d R_2 b}$

Q.5

Define the relation R on the set Z by a Rb if $a - b$ is a nonnegative even integer. Then consider the following statement regarding relation R: [NAT]

I. R is a partial order. ✓

II. R is a total order.

The number of correct statements for R is/are ?

$\{(a,b) \mid a-b = 2m\}$, $m = 0, 1, \ldots$

1) aRa $\quad a-a=0$ (✓)

2) $aRb \wedge bRa \rightarrow a=b$

$a-b \wedge b-a$. ✓

$aRb \wedge bRn \rightarrow aRn$. ✓

$a-b = 2m$ $\quad b-n = 2n$.

$a-b = 2m$

$b-n = 2n$.

$a-n = 2m+2n = 2(m+n)$.


THANK YOU GW
SOLDIERS !