SETS

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Solutions of WORKSHEET No: 2

S-2 solutions

Q:1 → Let A and B are two sets

Given $n(A) = p$

$n(B) = q$

No of subsets of I^{st} set $= 2^p$

No of subsets of 2^{nd} set $= 2^q$

Given: $2^p - 2^q = 112$

$2^p - 2^q = 128 - 16$

$2^p - 2^q = 2^7 - 2^4$

Comparing we get $p = 7$ & $q = 4$ Ans

— x —

Q:2 → $B = \{2, \{3\}, 5\}$

here $n = 3$

no of subsets $= 2^3 = 8$

Subsets:

$P(B)$ = set of all subsets of B

$P(B) = \{\{2\}, \{\{3\}\}, \{5\}, \{2, \{3\}\}, \{\{3\}, 5\}, \{2, 5\}, \{2, \{3\}, 5\}, \phi\}$

— x —

Q:3 → $A = \phi$

here $n = 0$

no of subsets of $A = 2^0 = 1$

S-2 solutions

Subsets of $A = \phi$

$P(A) = \{\phi\}$

here $n = 1$

no of subsets of $P(A) = 2^1 = 2$

Subsets of $P(A) = \{\{\phi\}, \phi$

$P(P(A)) = \{\{\{\phi\}, \phi\}$

here $n = 2$

no. of subsets of $P(P(A)) = 2^2 = 4$

Subsets of $P(P(A))) = \{\{\{\phi\}\}, \{\{\phi\}\}, \{\{\{\phi\}, \phi\}, \phi$

$P(P(P(A))) = \{\{\{\{\phi\}\}, \{\{\phi\}\}, \{\{\{\phi\}, \phi\}, \phi\}$ Ans

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Ans 4 → $U = \{1,2,3,4,5,6,7,8,9,10\}$

$A = \{1,2,3,5\}$, $B = \{2,4,6,7\}$, $C = \{2,3,4,8\}$

(1) $(A \cup B) \cap C = \{1,2,3,4,5,6,7\} \cap \{2,3,4,8\} = \{2,3,4\}$

(2) $(A \cap B) \cup C = \{2\} \cup \{2,3,4,8\} = \{2,3,4,8\}$

(3) $(A - B)' = \{1,3,5\}' = \{2,4,6,7,8,9,10\}$

(4) $(B - C)' = \{6,7\}' = \{1,2,3,4,5,8,9,10\}$

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(5) $(A \cup C)' = \{1,2,3,4,5,8\}' = \{6,7,9,10\}$

(6) $(A \cup B) \cap (A \cup C) = \{1,2,3,4,5,6,7\} \cap \{1,2,3,4,5,8\}$
$= \{1,2,3,4,5\}$

(7) Do yourself

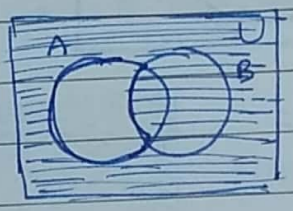
(8) $A \Delta B = (A-B) \cup (B-A) = \{3,1,5\} \cup \{4,6,7\}$
$= \{1,3,4,5,6,7\}$

(9) $(B \Delta C)' = ((B-C) \cup (C-B))' = (\{6,7\} - \{3,8\})' = \{6,7\}'$
$= \{1,2,3,4,5,8,9,10\}$

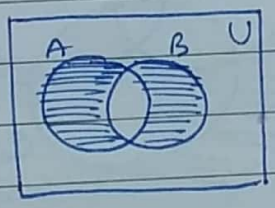
(10) $A \cap C' = A - C = \{1,5\}$

—x—

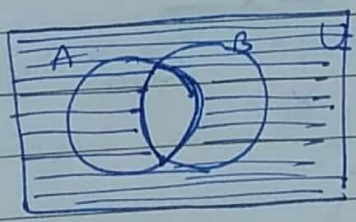
Q.No 5 → (1) $(A-B)'$ =



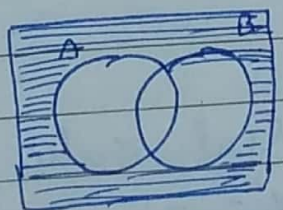
(2) $(A-B) \cup (B-A)$ =



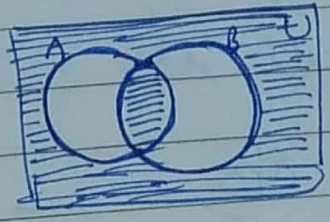
(3) $(A \cap B)'$ =



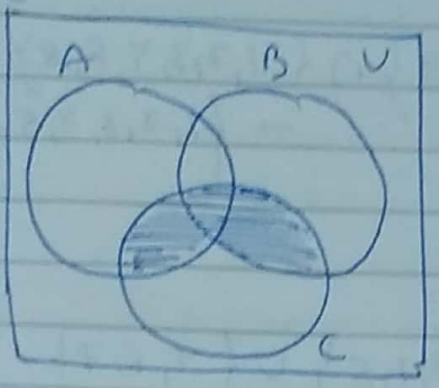
(4) $(A \cup B)'$ =



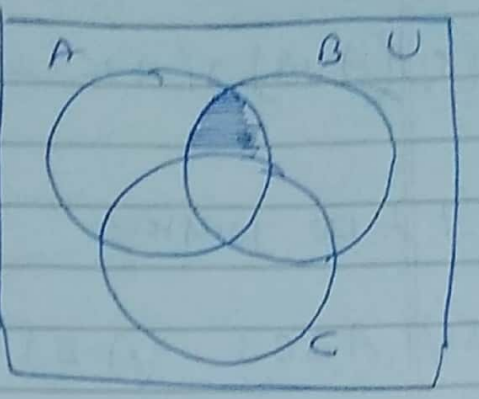
(5) $(A \Delta B)'$ =



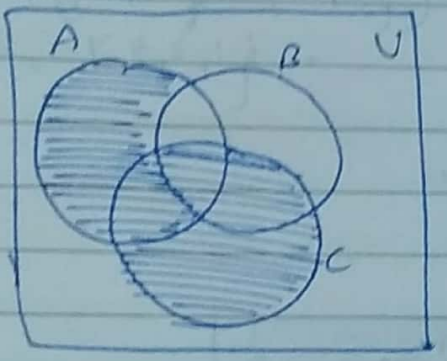
(6) $(A \cup B) \cap C$ =



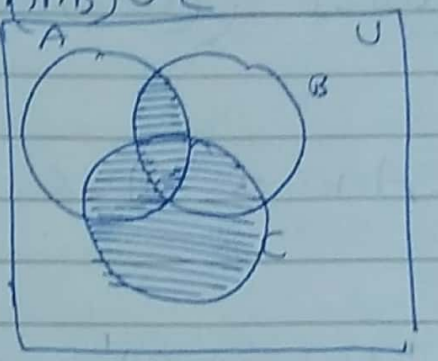
(7) $= (B - C) \cap A$



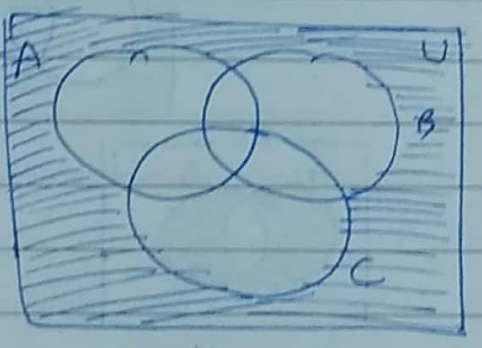
(8) $(A - B) \cup C$



(9) $(A \cap B) \cup C$



(10) $(A \cup B \cup C)'' =$



— x —

Ans 6 → ~~A~~ Given $y = \frac{1}{x}$ also $y = -x$

$\Rightarrow \frac{1}{x} = -x$

$\Rightarrow 1 = -x^2$

$\Rightarrow x^2 = -1$

but there is no real value of x such that $x^2 = -1$

$\therefore x \in$ Null set

$\therefore A \cap B = \phi$ Ans

— x —

Qn (7) $A = \{2, 3, 5, 6\}$

here $n = 4$

no of subsets $= 2^4 = 16$

& and itself A are not proper subsets

$\therefore$ number of proper subsets $= 16 - 2 = 14$ Ans

—x—

Qn 8 → $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$A = \{2, 4, 6, 8\}$ $B = \{2, 3, 5, 9\}$

(i) $A \cup B = \{2, 3, 4, 5, 6, 8, 9\}$

$(A \cup B)' = \{1, 7, 10\}$

$A' = \{1, 3, 5, 7, 9, 10\}$, $B' = \{1, 4, 6, 7, 8, 10\}$

$A' \cap B' = \{1, 7, 10\}$

clearly $(A \cup B)' = A' \cap B'$ Ans

(ii) Do yourself

—x—

Qn 9 → A → Set of all triangles with atleast one angle is different from 60°

A' → Set of that triangles whose no angle is different from 60°

that is all angles are 60°

$\therefore$ A' → Set of all equilateral triangles Ans

—x—