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Matric NO: A20MJ4005

Section: 15

Assingment: 1(a)

① given that,

$B = \{1, 2, 5, 8, 11\}$

a) $\{5, 1\} \subseteq B$ is a proper subset of B

$\therefore \{5, 1\} \subset B$

so, $\{5, 1\} \subseteq B$ is false.

b) $\{8, 1\} \in B$

here, $8 \in B$, $1 \in B$

But $\{8, 1\} \notin B$, Becuse $\{8, 1\}$ is not an element of B

$\therefore \{8, 1\} \in B$ is false.

c) $\{1, 8, 2, 11, 5\} \subsetneq B$

here, $B = \{1, 2, 5, 8, 11\} = \{1, 8, 2, 11, 5\}$

$\therefore \{1, 8, 2, 11, 5\}$ is im proper subset of B

so $\{1, 8, 2, 11, 5\} \subsetneq B$ is false.

(2)

a) $x = \{1, 3, 6, 7, 9\}$

a) $\{1\}, \{3\}, \{6\}, \{7\}, \{9\}, \{1,3\}, \{1,6\}, \{1,7\},$
$\{1,9\}, \{3,6\}, \{3,7\}, \{3,9\}, \{6,7\}, \{6,9\}, \{7,9\},$
$\{1,3,6\}, \{1,3,7\}, \{1,3,9\}, \{3,6,7\}, \{3,6,9\}, \{6,7,9\},$
$\{1,6,7\}, \{1,6,9\}, \{1,7,9\},$

b) $|P(x)| = 2^{|x|} = 2^5 = 32$

(3) $U = \{a, b, c, d, e, f, g, h, i, j, k, l, m\}$, $A = \{a, c, f, m\}$

$B = \{b, c, g, h, m\}$

a) $A \cap B = \{a, c, f, m\} \cap \{b, c, g, h, m\}$
$= \{c, m\}$

b) $|A \cup B| = |\{a, c, f, m\} \cup \{b, c, g, h, m\}|$
$= |\{a, b, c, f, g, h, m\}|$
$= 7$

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c) $B - A = \{b, c, g, h, m\} - \{a, c, f, m\}$

$= \{b, g, h\}$

d) $B' = U - B = \{a, b, c, d, e, f, g, h, i, j, k, l, m\}$

$- \{b, c, g, h, m\}$

$= \{a, d, e, f, i, j, k, l\}$

e) $A \cup B = \{a, c, f, m\} \cup \{b, c, g, h, m\}$

$= \{a, b, c, f, g, h, m\}$

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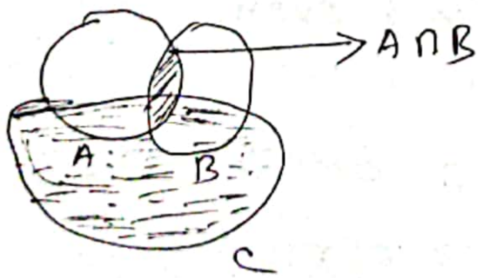
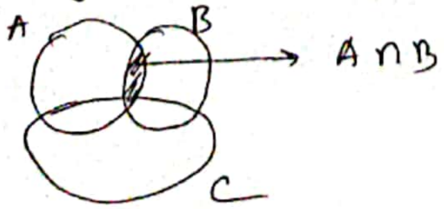
a) $(A \cap B) \cup C$



b) $(A \cap B) - C$



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a) $(A \cap B) - C$

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

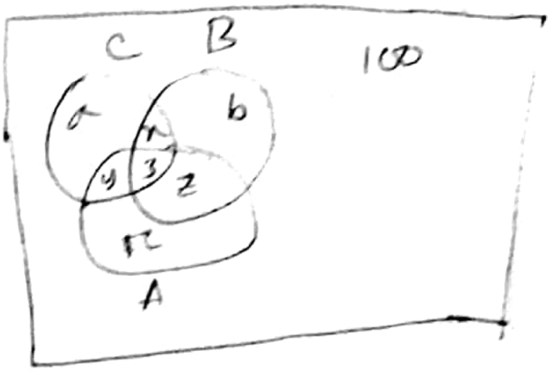
⑥

given that,

$x_1+3=12 \Rightarrow x=9$

$y+3=5 \Rightarrow y=2$

$z+3=4 \Rightarrow z=1$



and,

$a+x+3+y=18$

$\Rightarrow a+9+3+2=18$

$\Rightarrow a=4$

$b+x+3+z=40$

$\Rightarrow c+9+3+1=40$

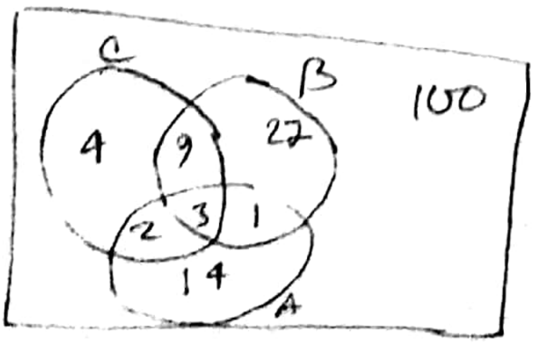
$\Rightarrow c=27$

$d+3+y+r=20$

$\Rightarrow 1+3+2+r=20$

$\Rightarrow r=14$

a)



venn diagram.

b) Student who eat at least one of the kind of meal = $a + x + 3 + y + d + b + z$

$= 4 + 9 + 3 + 2 + 1 + 27 + 14$

$= 60$

c) ~~No of~~ non meal eaters $= 100 - 60$

$= 40$

d) only lamb eater $= 14$

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a) Preoposition

b) Command, so not preoposition.

c) questionairee, so not preoposition.

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8)

a) $\neg(\neg p \wedge q) \vee q$

p	q	$\neg p$	$\neg p \wedge q$	$\neg(\neg p \wedge q)$ (A)	$A \vee q$
T	T	F	F	T	T
T	F	F	F	T	T
F	T	T	T	F	T
F	F	T	F	T	T

b) $(p \rightarrow r) \leftrightarrow (q \rightarrow r)$

p	q	r	$p \rightarrow r$ (A)	$q \rightarrow r$ (B)	$A \leftrightarrow B$
T	T	T	T	T	T
T	T	F	F	F	T
T	F	F	F	T	F
T	F	T	T	T	T
F	T	F	T	F	F
F	F	T	T	T	T
F	T	T	T	T	T
F	F	F	T	T	T

9) $p = T$, $q = F$, $r = T$

a) $\neg(p \rightarrow q) \wedge (p \vee r)$

$= \neg(T \rightarrow F) \wedge (T \vee T)$

$= \neg(F) \wedge T = T \wedge T = T$ (True)

b) $p \vee r \leftrightarrow \neg q$

$= T \vee T \leftrightarrow T$

$= T$ (True)

10) $S = p \wedge (\neg q \vee r)$

$T = p \vee (q \wedge \neg r)$

It is very clear that these are not equivalent.

So, $S \neq T$

11)

a) given $P(x) =$ x is a student

$Q(x) =$ x own iPad.

a) $\forall x (P(x) \rightarrow Q(x))$

$= \forall x (\neg P(x) \vee Q(x))$

All student own an ipad.

b) $\nexists x (Q(x) \rightarrow P(x))$

there are some people who own ipad are students.

(12)

a) here, $P(x)$: " x is lecturer", ~~$q(x)$~~

$q(x)$: " x own Porsche"

are given quentifiers.

∴ given statment is a lecturer own Porsche.

∴ here domain for x is consist of people in word

∴ we can translate our statement as

$(\forall x)\,(P(x) \rightarrow Q(x))$

b) given statement is, "some one who own a Porsche is lecturer."

Here again domain for x is consist of all people in word.

∴ We can translate our statement as

$(\exists x)\,(P(x) \rightarrow Q(x))$

(13)

a) Herre given Statement is $\forall x(x^2 > x)$

and domain consist of all rreal numbea.

$\therefore$ given statement is false.

$\therefore$ for we given counter pxample

let $x = 0.5$, $x^2 = 0.25$

here $x^2 < x$ for $x = 0.5$

$\therefore$ statement is fake for $x = 0.5$

(14) Let $2n$ and $2n+1$ be two consecutive integers

~~2n + (n+~~

$$2n(2n+1) = 2n + 2n + 1$$
$$= 4n + 1$$
$$= 2(2n) + 1$$

The sum is of the ~~form~~ form $2m+1$ so this is always odd integer.

(15) Assume that $5n+2$ is odd, $n \in Z$

to Prove n is odd

Let us assume that n is even.

suppose $n = 2m$

$$5n + 2 = 5(2m) + 2 = 10m + 2$$
$$= 2(5m+1)$$

$2(5m+1)$ is even which contradicts the fact that "$5n+2$" is odd.

Hence "n" is odd.

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