

AL-EMRAN
A20MJ1003
Assignment-1(a)

- (a) $(5,1)$ is the subset of $B = \{1, 2, 5, 8, 11\}$ - True .
(b) $(8,1)$ is belong to B . - True .
(c) also true .

Ans to the Qus No. 2

(a) proper subset of x is :

$\emptyset, \{1\}, \{3\}, \{6\}, \{7\}, \{9\}, \{1, 3\}, \{1, 6\}, \{1, 7\}, \{1, 9\}, \{3, 6\},$
 $\{3, 7\}, \{3, 9\}, \{6, 7\}, \{6, 9\}, \{7, 9\}$

(b) $|P(x)|$: Power of $x = 2^n$ $[n=5]$
 $= 32$.

Ans to the Qus 1b, 3

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

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

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

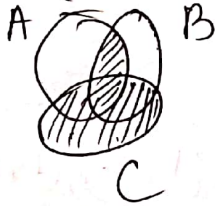
(d) $B' = U - B = \{a, b, c, d, e, f, g, h, i, j, k, l, m\} -$
 $\{b, c, g, h, m\}$
 $= \{a, d, e, f, i, j, k, l\}$

$$3. (e) (A \cup B) = \{a, c, f, m\} \cup \{b, c, g, h, m\} \\ = \{a, b, c, f, g, h, m\}$$

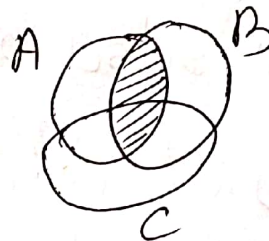
Ans to the Qus No. 9

Venn diagram for set A, B and C:

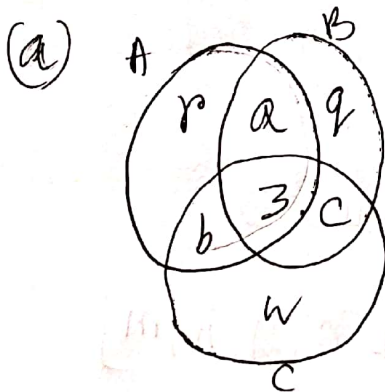
(a) $(A \cap B) \cup C$



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



Ans to the Qus No. 10



$$c + 3 = 9$$

$$z = 1$$

$$a + 3 = 12$$

$$\Rightarrow a = 9$$

$$b + 3 = 5$$

$$\Rightarrow b = 2$$

$$r + a + 3 + b = 18$$

$$\Rightarrow r = 9$$

$$c + 3 + b + w = 20$$

$$\Rightarrow w = 13$$

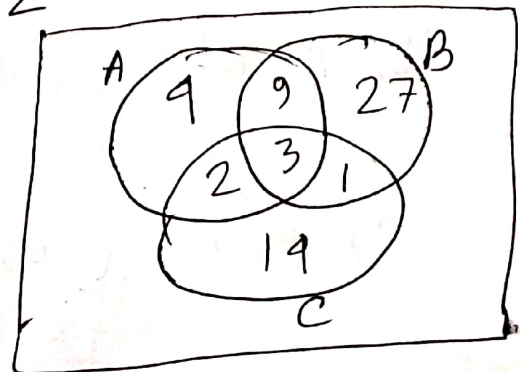
$$q + a + 3 + 2 = 40$$

$$\Rightarrow q = 27$$

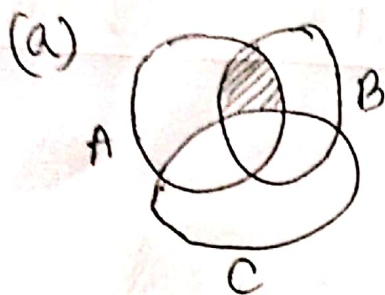
$$\begin{aligned} b) & r + a + 3 + c + 2 + q + w \\ &= 9 + 9 + 3 + 2 + 1 + 27 + 13 \\ &= 60 \end{aligned}$$

c) $100 - 60 = 40$

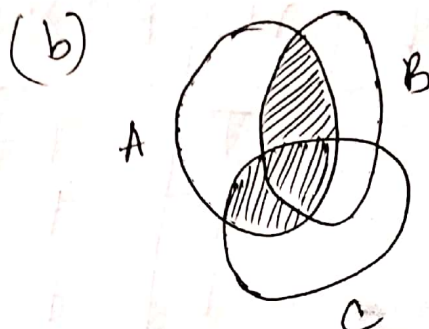
d) 19



Ans to the Qus. No. 5



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



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

Ans to the Qus No 7.

(a) proposition.

(b) command not proposition.

(c) Questionnaires is no proposition.

Ans to the Qus. No. 8

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

P	q	$\neg p$	$\neg p \wedge q$	$\neg(\neg p \wedge q)$	$\neg(\neg p \wedge q) \vee q$
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	$p \rightarrow r$	$q \rightarrow r$	$(p \rightarrow r) \leftrightarrow (q \rightarrow r)$
T	T	F	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	T	T	T	T	T
F	F	T	T	T	T
F	F	F	T	T	T

Ans to the Qus No. 9

$$\begin{aligned}
 (a) & \neg(p \rightarrow q) \wedge (p \vee r) \\
 &= \neg(p \rightarrow q) \wedge (p \vee r) \\
 &= \neg(T \rightarrow F) \wedge (T \vee T) \\
 &= \neg(F) \wedge T \\
 &= T \wedge T \\
 &= T = \text{True}
 \end{aligned}$$

$$\begin{aligned}
 p &= F \\
 q &= F \\
 r &= T \\
 \therefore T \rightarrow F &= F
 \end{aligned}$$

$$\begin{aligned}
 (b) & p \vee r \leftrightarrow \neg q \\
 &= T \vee T \leftrightarrow T \\
 &= \text{True}
 \end{aligned}$$

$$\begin{aligned}
 p &= T \\
 r &= T
 \end{aligned}$$

Ans to the Qus. No. 10

$$S = p \wedge (\neg q \vee r) \text{ and } T = p \vee (q \wedge \neg r)$$

$$S \equiv T \text{ or } S \equiv \neg T$$

p	q	r	$\neg q$	$\neg r$	$(\neg q \vee r)$	$(q \wedge \neg r)$	S	T
T	T	T	F	F	T	F	T	T
T	T	F	F	T	F	T	F	T
T	F	T	T	F	T	F	T	T
T	F	F	T	T	T	F	F	F
F	T	T	F	F	T	F	F	F
F	T	F	F	T	F	T	F	F
F	F	T	T	F	T	F	F	F
F	F	F	T	T	T	F	F	F

Ans. to the Qus No. 11

$P(x) = "x \text{ is a student}"$

$Q(x) = "x \text{ owns an ipad}"$

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

domain all students in MJIT

All students own an ipad.

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

Some students own an ipad.

Ans to the Qus No. 12

$p(x)$ = "x is a lecturer"

$Q(x)$ = "x owns a porsche"

a) All lecturer own porsches

$$(\forall x) (p(x) \rightarrow Q(x))$$

$$b) (\exists x) (p(x) \rightarrow Q(x))$$

Ans to the Qus No. 13

$$\forall(x) (x^2 > x)$$

domain set of real numbers.

$$\text{if } x = 0.5, x^2 = 0.25$$

$x^2 < x$ will be false.

Ans to the Qus. No. 14.

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

So it will be odd.

Ans to the Qus No. 15

S_{n+2} is assumed odd.

$$n=1, \quad S(1)+2=7$$

$$n=2, \quad S(2)+2=12 \text{ even}$$

$$n=3, \quad S(3)+2=17$$

$n = \text{odd}$.