Math   102
Practice Test 1 – Sets

1. $\{0,1,2,\ldots,10\} = A$

   set builder form: $A = \{x \mid 0 \leq x \leq 10, x \in Z\}$

2. $\{x : x \text{ is an integer less than } 4\} = B$

   $B = \{-\infty, -3, -2, -1, 0, 1, 2, 3\}$

3. $\{a, b, c, d, e, f, h, i\} = C$

   subsets of $C = 2^8 = 256$

   $= \{ \phi,$
   $\{a\}, \{b\}, \ldots, \{i\},$
   $\{a, b\}, \{b, c\}, \ldots, \{h, i\},$
   $\{a, b, c\}, \{b, c, d\}, \ldots, \{f, h, i\},$
   $\{a, b, c, d\}, \ldots, \{e, f, h, i\},$
   $\ldots \{a, b, c, d, e, f, g, h, i\}$

4.

   a. $\{0, 1, 2, 3, 4, 5, 6, 7\} = $ ~~(scribbled out)~~

   $\{x : 0 \leq x \leq 7, x \in \mathbb{Z}\}$

   OR

   $\{x : x \leq 7, x \in \mathbb{Z} - \mathbb{Z}^-\}$

b. {January, February, March, April, May} = E

$$F = \{x : x \in \text{Month of the year coming before June}\}$$

5

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

$$A = \{2, 4, 6, 8\}$$

$$B = \{1, 3, 4, 5, 7\}$$

$$C = \{7, 8\}$$

(a) $A \cap B = \{4\}$

(b) $B' = \{2, 6, 8, 9\}$

(c) $A' \cup B' = \{1, 3, 5, 7, 9, 2, 6, 8\}$

(d) $A - B = \{2, 6, 8\}$

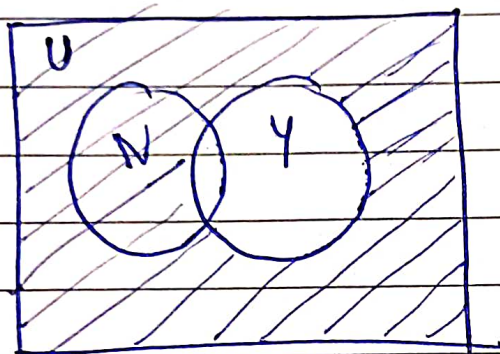(e) $(A \cap C) \cap (A \cup B) = \{8\}$

6. List of all the subsets $\{t, i, m\}$

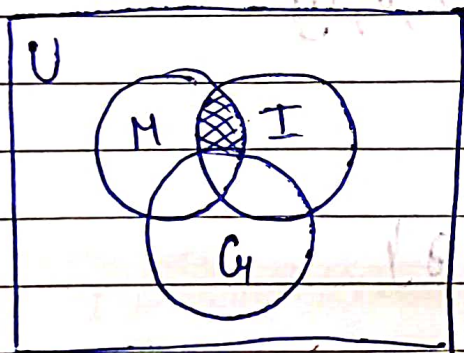$$= \{\phi, \{t\}, \{i\}, \{m\}, \{t, i\}, \{i, m\}, \{t, m\}, \{t, i, m\}\}$$
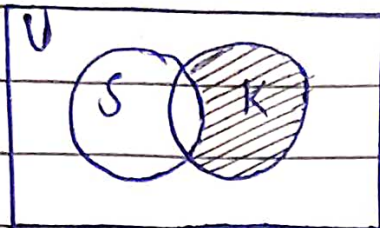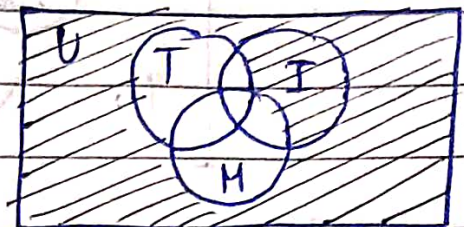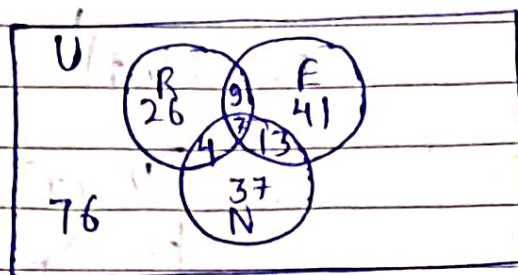
θ.

a.

Y' (shaded region)

b.

$(M \cap I) \cap G'$

9. a. $S' \cap K$ b. $(T \cup M)'$

10.

a. $n(N) = 37+13+7+4 = 61$

b. $n[(R \cap E) \cup N] = 9+7+4+13+37 = 70$

c. $n(E') = 143$

d. $n(E-R) = 41+13 = 54$

e. $n(U) = 213$

f. $n(R \cap E \cap N) = 7$

11.

(a.) All sets that are equal are also equivalent

— (TRUE)

(b.) $A' \cap B' = (A \cap B)'$

— (FALSE)

Correct statement:

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

(c.) set F = {1,2,3} and set G = {2,3,1}, then F ⊂ G

-(FALSE)

correct statement

, F ⊆ G

(d.)   U' = { }

- (TRUE)

(e.) The number of proper subsets of a given set is
one-less than the number of subsets for the
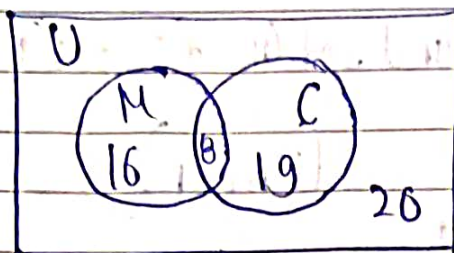same set.

- (TRUE)

$2^n - 1$ (proper subsets)

(f.) $n(T \cup L) = n(T) + n(L)$

- (TRUE) if $(T \cap L = \phi)$

otherwise,
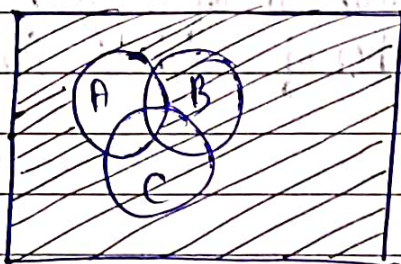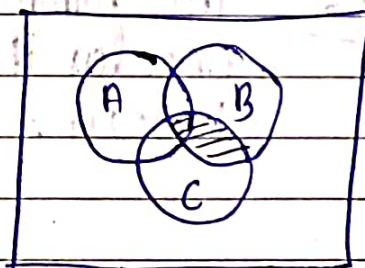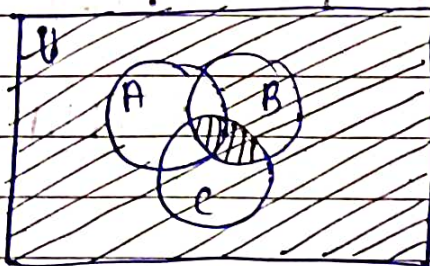
$n(T \cup L) = n(T) + n(L) - n(T \cap L)$

12.

(a.) $n(M' \cup C') = 19 + 20 + 16 = 55$

13.

$A \cup (B \cap C)$

A'

$B \cap C$

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

14.

(a.) $\{\} \subset \{2,4\}$ $\because \phi$ is a subset of
every set

(b.) whole (W) $\subset$ Rational numbers (Q)
numbers

(c.) $-2 \notin \mathbb{N}$

(d.) $-6 \in \{x : x$ is a solution to the equation $x^2 = 36\}$

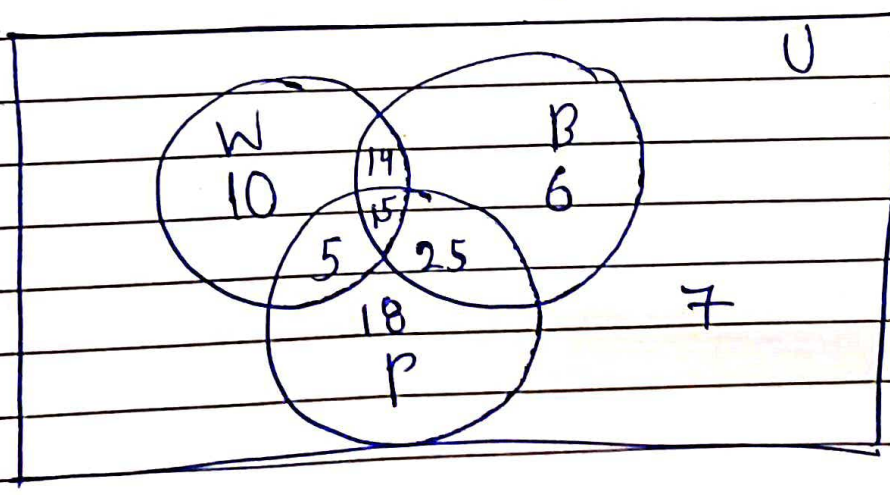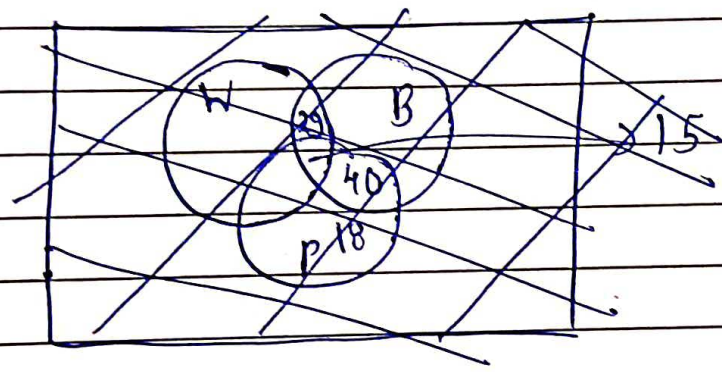15.   Web = W
       books = B
       periodicals = P

W
B
40
P 18
15

U

W
10
14
15
5   25
18
P
B
6

7

(a.) webin
     research

44

(b.) n(B∪P)
   = 83