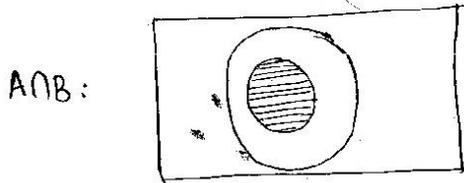
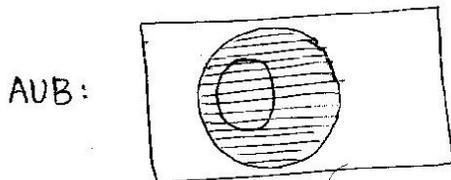
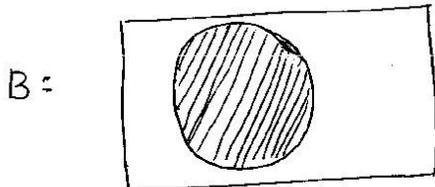
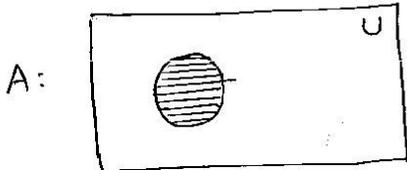


Exercise 2.2

Q # 1:

i) $A \subseteq B$



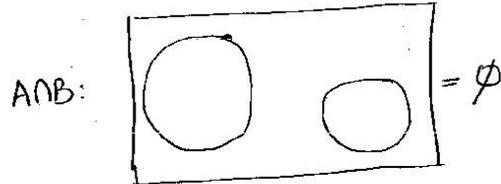
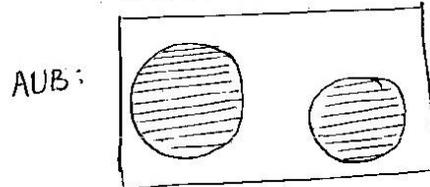
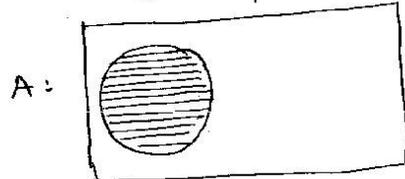
ii) $B \subseteq A$

Just interchange A and B in above case.

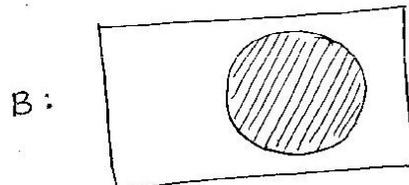
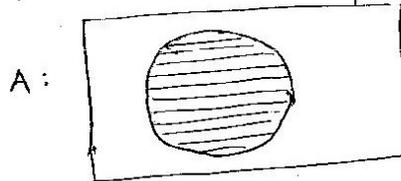
iii) $A \cup A'$

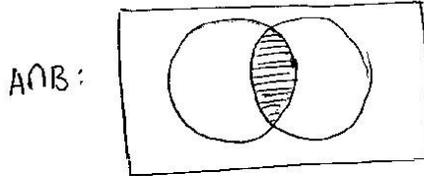
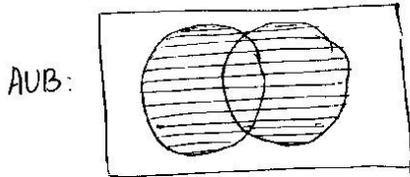
Unable to understand, what is this? FALSE
see relationship between A & B at page 39 (of book)

iv) A and B are disjoint
i.e. $A \cap B = \emptyset$



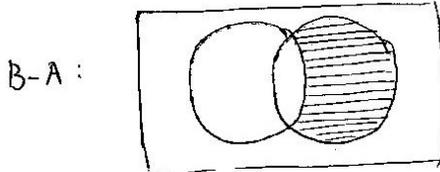
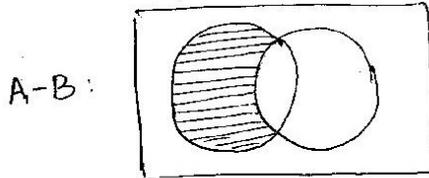
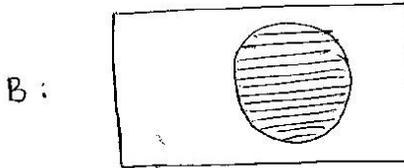
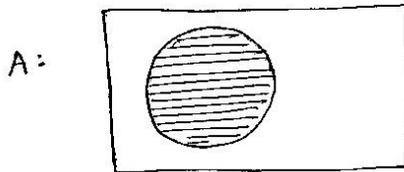
v) A and B are overlapping sets



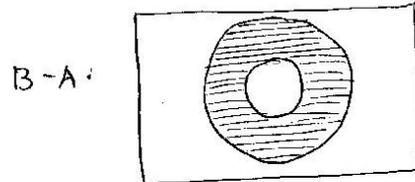
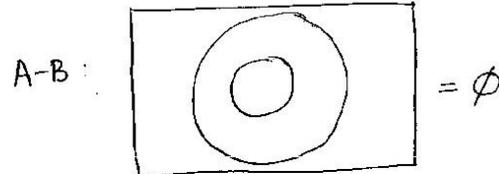
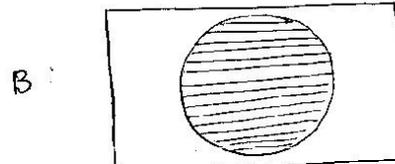
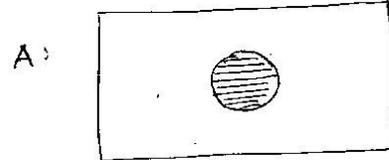


Q#2:

i) A and B are overlapping set



ii) $A \subseteq B$



ii) $B \subseteq A$

Do yourself, just interchange ^{interchange} ~~replace~~ A and B in above question.

Q#3:

i) $A \cup B = A$
if $B \subseteq A$ or $(B = \emptyset)$

ii) $A \cup B = B$ if $A \subseteq B$

iii) $A - \emptyset = A$ (if $A = \emptyset$)

* Correction

$A - B = \emptyset$ if $A \cap B = \emptyset$

iv) $A \cap B = B$ if $B \subseteq A$

v) $n(A \cup B) = n(A) + n(B)$
if $A \cap B = \emptyset$

vi) $n(A \cap B) = n(A)$ if $A \subseteq B$.

- vii) $A - B = A$ if $A \cap B = \emptyset$
 viii) $n(A \cap B) = 0$ if $A \cap B = \emptyset$
 ix) $A \cup B = U$
 if $B = A'$ or $A = B'$
 x) $A \cup B = B \cup A$
 it is always true.
 xi) $n(A \cap B) = n(B)$ if $B \subseteq A$.
 xii) $U - A = \emptyset$ if $U = A$.

Q # 4:

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

$$A = \{2, 4, 6, 8, 10\}$$

$$B = \{1, 2, 3, 4, 5\}$$

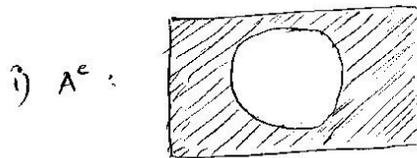
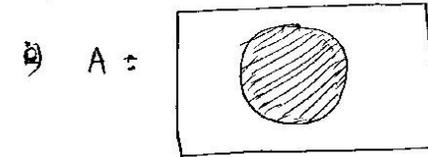
$$C = \{1, 3, 5, 7, 9\}$$

- i) $A^c = U - A$
 $= \{1, 3, 5, 7, 9\}$
 ii) $B^c = U - B$
 $= \{6, 7, 8, 9, 10\}$
 iii) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 iv) $A - B = \{6, 8, 10\}$
 v) $A \cap C = \{ \}$ i.e. \emptyset
 vi) $A^c \cup C^c = (U - A) \cup (U - C)$
 $= \{1, 3, 5, 7, 9\} \cup \{2, 4, 6, 8, 10\}$
 $= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 vii) $A^c \cup C = \{1, 3, 5, 7, 9\} \cup \{1, 3, 5, 7, 9\}$
 $= \{1, 3, 5, 7, 9\}$

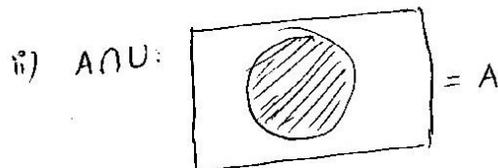
$$\text{viii) } U^c = U - U$$

$$= \emptyset$$

Q # 5:



$$= U - A$$



$$= A$$

$$\text{iv) } A \cup U = U$$

$$\text{v) } A \cup \emptyset = A \quad \text{vi) } \emptyset \cap \emptyset = \emptyset$$

Q # 6:

This is a very good question but there is no condition on A and B like in Q # 1 and 2. The conditions are the following:

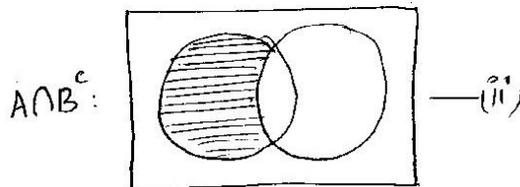
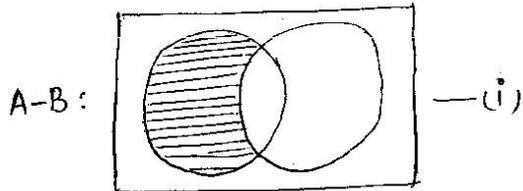
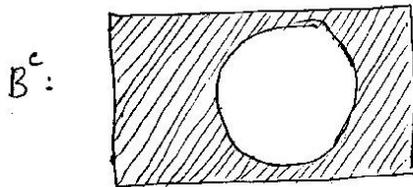
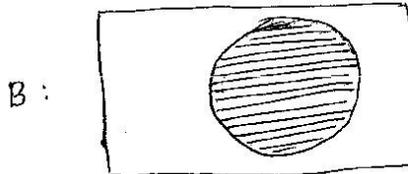
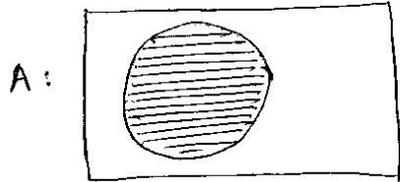
i) $A \subseteq B$ ii) $B \subseteq A$

iii) A and B are disjoint
 i.e. $A \cap B = \emptyset$

iv) A and B are overlapping.

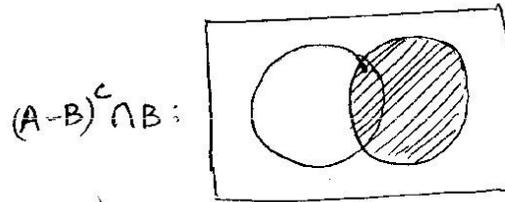
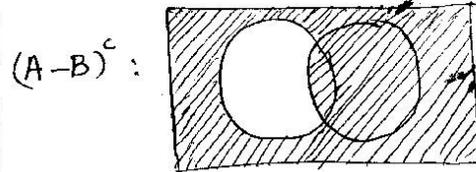
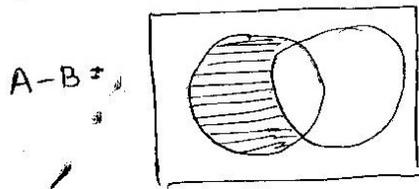
We only discuss last condition. You may solve others yourself.

i) $A - B = A \cap B^c$ *Correction



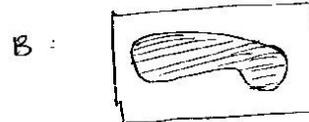
From (i) & (ii) $A - B = A \cap B^c$

ii) $(A - B)^c \cap B = B$



= B proved

Note: For the sake of beauty, we draw sets as circular region, otherwise we can draw any close region to show set, e.g.



~ x ~ x ~ a ~
 —: END:—