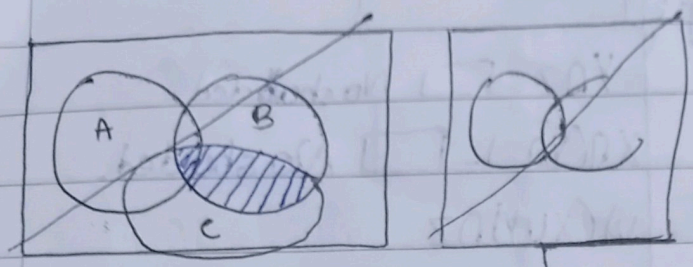
Unit 3

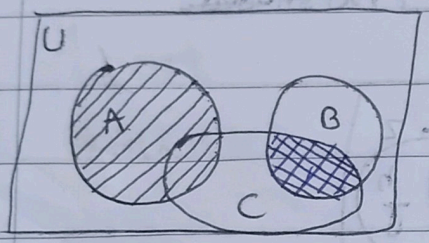
Ex 3.1

Q1

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



$B \cap C = \{$

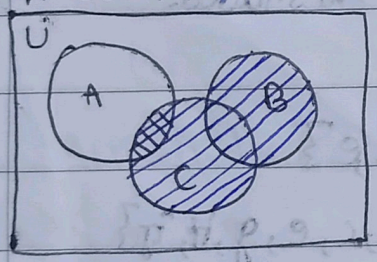


$B \cap C =$ ▨

$A \cup (B \cap C) =$ ▨

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

iii)

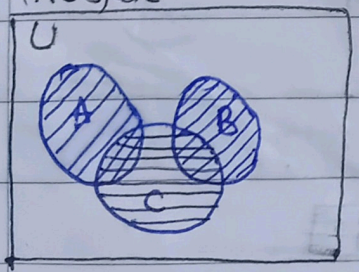


$B \cup C =$ ▨

$A \cap (B \cup C) =$ ▨

$(A \cup B) \cup C$

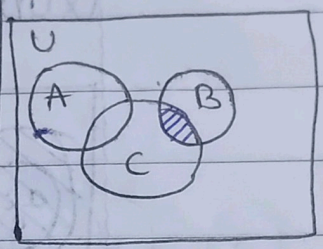
iii)



$A \cup B =$ ▨

$(A \cup B) \cup C =$ ▨

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

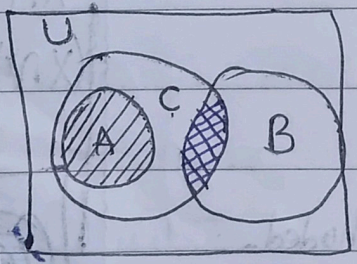


$B \cap C =$ ▨

$A \cap (B \cap C) =$ ▭ No shaded

2 part

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



$B \cap C =$ ▨

$A \cup (B \cap C) =$ ▨

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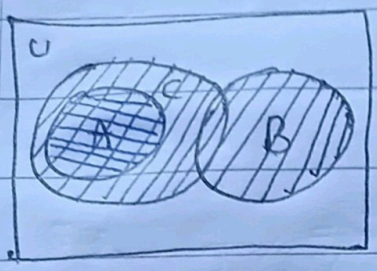
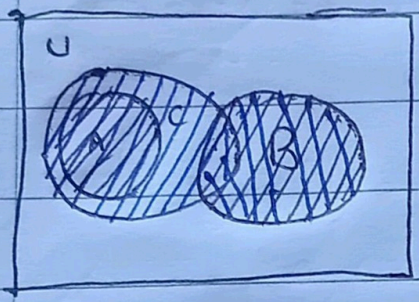
ii) $A \cap (B \cup C)$

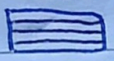


$B \cup C =$ 

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

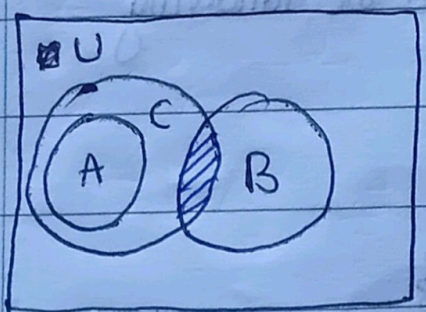
iii) $(A \cup B) \cup C$

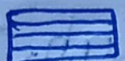


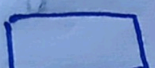
$A \cup B =$ 

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

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

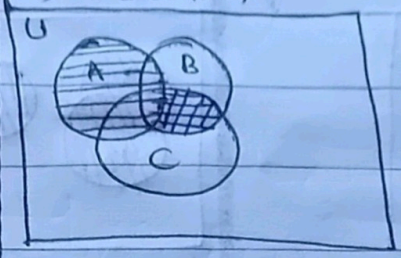


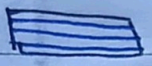
$B \cap C =$ 

$A \cap (B \cap C) =$  No shaded

3part

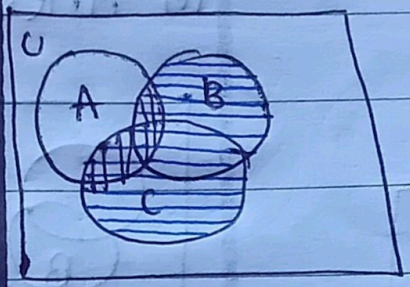
i) $A \cup (B \cap C)$



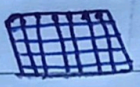
$B \cap C =$ 

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

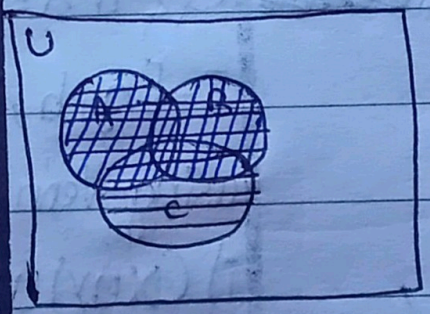
ii) $A \cap (B \cup C)$



$B \cup C =$ 

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

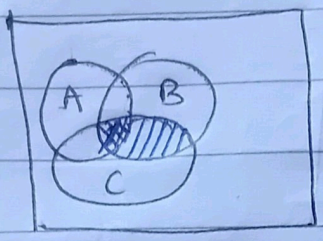
iii) $(A \cup B) \cup C$



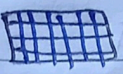
$A \cup B =$ 

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

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

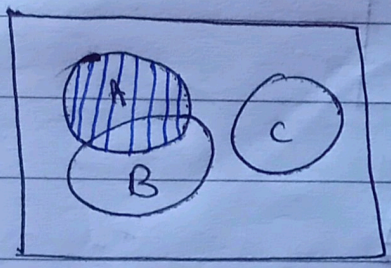


$B \cap C =$ 

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

4 part

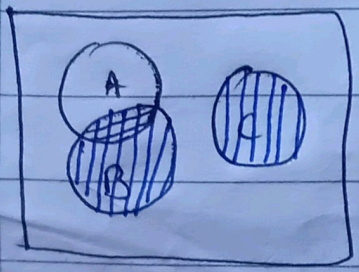
i) $A \cup (B \cap C)$



$B \cap C =$  Noshaded

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

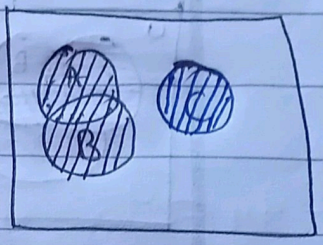
ii) $A \cap (B \cup C)$



$B \cup C =$ 

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

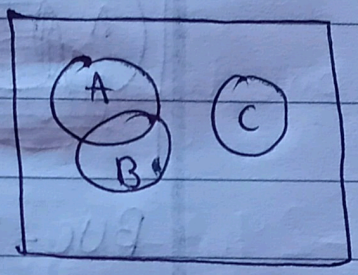
iii) $(A \cup B) \cup C$

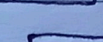


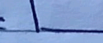
$A \cup B =$ 

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

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



$B \cap C =$  Noshaded

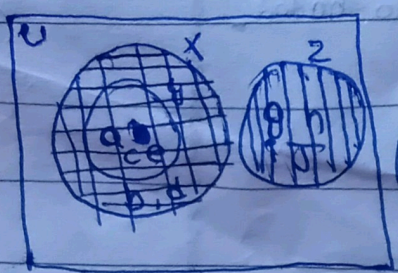
$A \cap (B \cap C) =$  No shaded

Q2 if $X = \{a, b, c, d, e\}$ $Y = \{a, c, e\}$ $Z = \{g, h, i, j\}$ then find the following using Venn diagram?

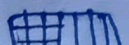
i) $(X \cup Y) \cup Z$

$(X \cup Y) = \{a, b, c, d, e\}$

$(X \cup Y) \cup Z = \{a, b, c, d, e, g, h, i, j\}$



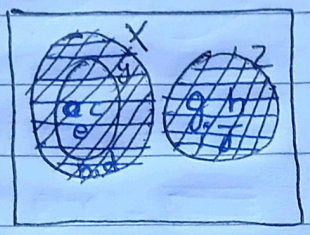
$X \cup Y =$ 

$(X \cup Y) \cup Z =$ 

ii) $X \cup (Y \cup Z)$

$Y \cup Z = \{a, c, e, g, h, i, j\}$

$X \cup (Y \cup Z) = \{a, b, c, d, e, g, h, i, j\}$



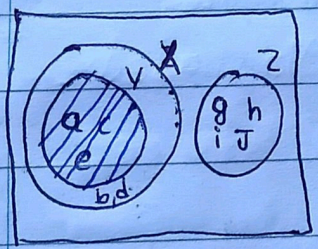
$Y \cup Z =$ ▥

$X \cup (Y \cup Z) =$ ▦

iii) $(X \cap Y) \cap Z$

$X \cap Y = \{a, c, e\}$

$(X \cap Y) \cap Z = \{\ \}$



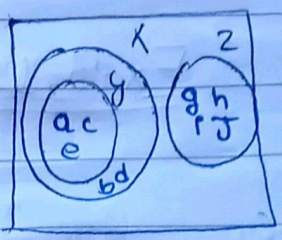
$X \cap Y =$ ▥

$(X \cap Y) \cap Z =$ ▭ No shaded.

iv) $X \cap (Y \cap Z)$

$Y \cap Z = \{\ \}$

$X \cap (Y \cap Z) = \{\ \}$ No shaded



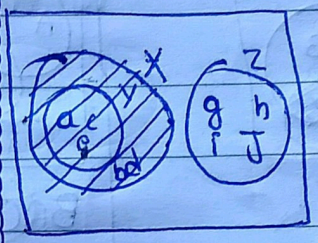
$Y \cap Z =$ ▭ No shaded

$X \cap (Y \cap Z) =$ ▭ No shaded.

v) $(X \cup Y) \cap Z$

$X \cup Y = \{a, b, c, d, e\}$

$(X \cup Y) \cap Z = \{\ \}$ ~~No shaded.~~



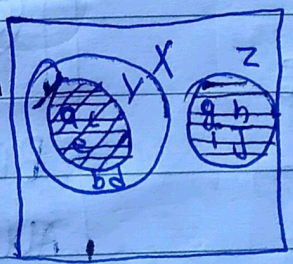
$X \cup Y =$ ▥

$(X \cup Y) \cap Z =$ ▭ No shaded.

vi) $(X \cap Y) \cup Z$

$X \cap Y = \{a, c, e\}$

$(X \cap Y) \cup Z = \{a, c, e, g, h, i, j\}$



$X \cap Y =$ ▥

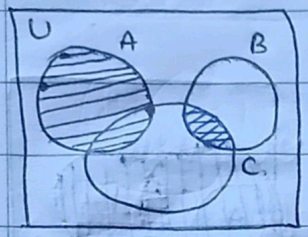
$(X \cap Y) \cup Z =$ ▦

Distributive propety union over Intersection.

Q4) i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

L.H.S

$A \cup (B \cap C)$

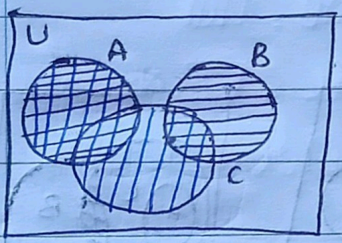


$B \cap C =$ 

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

R.H.S

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



$A \cup B =$ 

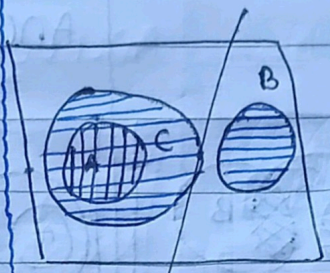
$A \cup C =$ 

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

Distributive propety Intersection over union.

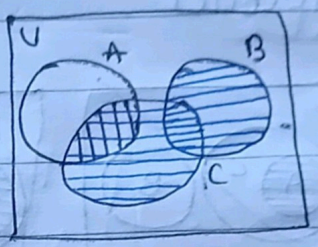
L.H.S

$A \cap (B \cup C)$



$B \cup C =$ 

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

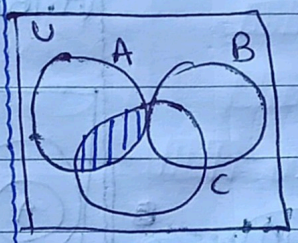


$B \cup C =$ 

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

R.H.S

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



$A \cap B =$  No shaded.

$A \cap C =$

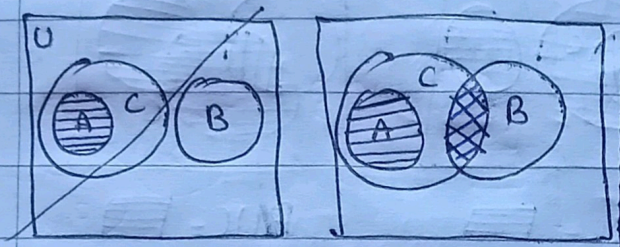
$(A \cap B) \cap (A \cap C) =$ 

(P∪Q)∪

Distributive properties union over Intersection.

L.H.S.

A∪(B∩C)

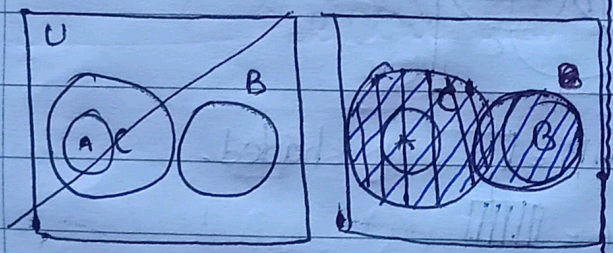


B∩C =

A∪(B∩C) =

R.H.S

(A∪B)∩(A∪C)



A∪B =

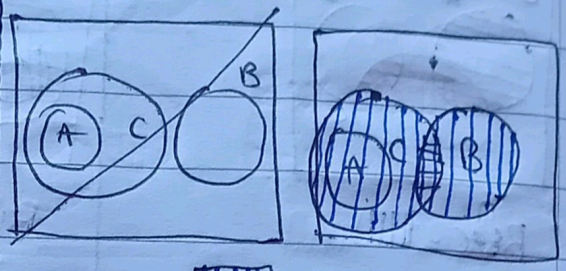
A∪C =

(A∪B)∩(A∪C) =

Distributive propetite Intersection over union

L.H.S

A∩(B∪C)

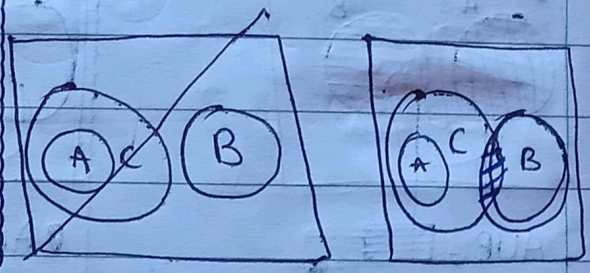


B∪C =

A∩(B∪C) =

R.H.S

(A∩B)∪(A∩C)



A∩B = No shaded.

A∩C =

(A∩B)∪(A∩C) =

S

= {0,1,2,3,4,5,6}

R= {0 1 2 3 4 5 6 7 8 9}

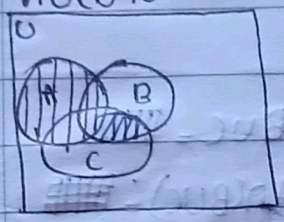
QUR= {2,3,4,5,6,7,8,9}

PU(QUR)= {0,1,2,3,4,5,6,7,8,9}

Distributive prepetite union over Intersection.

L.H.S

AU(B∩C)

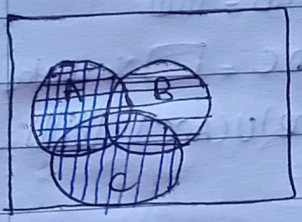


B∩C =

AU(B∩C) =

R.H.S.

(AUB)∩(AUC)



AUB =

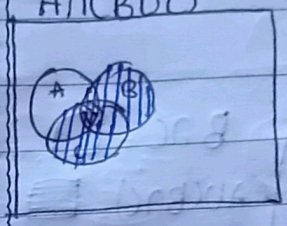
AUC =

(AUC)∩(AUB) =

Distributive Intersection over union.

L.H.S

A∩(BUC)

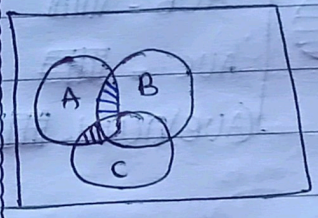


BUC =

A∩(BUC) =

R.H.S

(A∩B)U(A∩C)



A∩B =

(A∩C) =

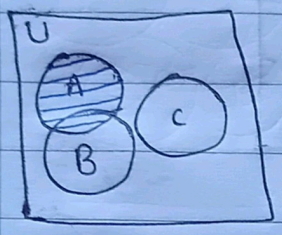
(A∩B)U(A∩C) =

(PUQ)UR= [illegible]

Distributive propetite union over Intersection.

L.H.S

AU(B∩C)

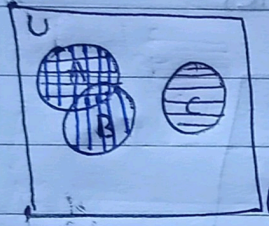


B∩C = □

AU(B∩C) = ▤

R.H.S

(AUB)∩(AUC)



AUB = ▥

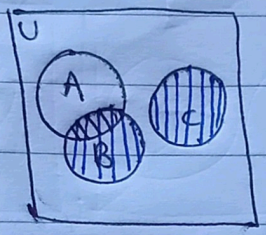
AUC = ▦

(AUB)∩(AUC) = ▩

Distributive propetite Intersection over union.

L.H.S.

A∩(BUC)

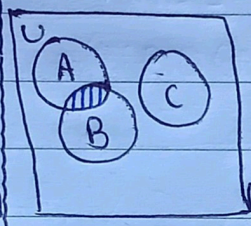


BUC = ▥

A∩(BUC) = ▦

R.H.S

(A∩B)U(A∩C)



A∩B = ▥

A∩C = □ No shaded

(A∩B)U(A∩C) = ▥

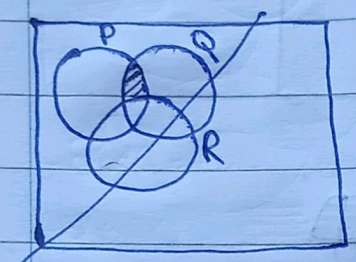
Q5 Prove by using Venn digram i) P={0,1,2,3}, Q={2,3,4,5,6} R={5,6,7,8,9}

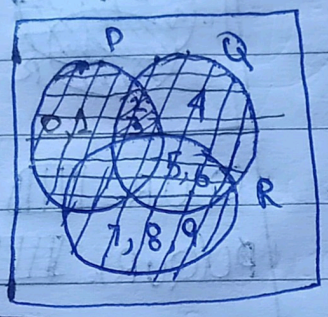
a) (P∪Q)∪R = P∪(Q∪R)

L.H.S

P∪Q = {0,1,2,3,4,5,6}

(P∪Q)∪R = {0,1,2,3,4,5,6,7,8,9}





P∪Q = ▨

(P∪Q)∪R = ▦

R.H.S

Q∪R = {2,3,4,5,6,7,8,9}

P∪(Q∪R) = {0,1,2,3,4,5,6,7,8,9}

Q∪R = ▤

P∪(Q∪R) = ▦

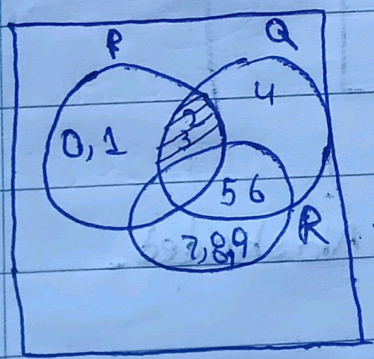
∴ L.H.S = R.H.S

b) (P∩Q)∩R = P∩(Q∩R)

L.H.S.

P∩Q = {2,3}

(P∩Q)∩R = { }



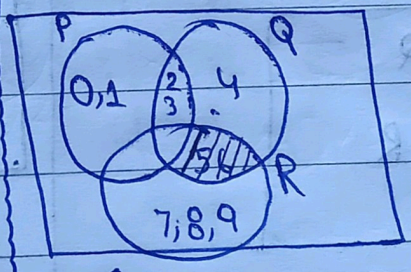
P∩Q = ▤

(P∩Q)∩R = □ No shaded.

R.H.S

Q∩R = {5,6}

P∩(Q∩R) = { }



Q∩R = ▦

P∩(Q∩R) = □ No shaded.

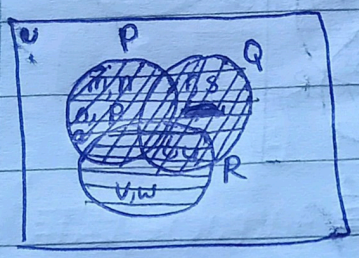
ii) $P=\{m,n,o,p,q\}$ $Q=\{r,s,t,u\}$ $R=\{t,u,v,w\}$

a) $(P\cup Q)\cup R = P\cup(Q\cup R)$

L.H.S

$P\cup Q=\{m,n,o,p,q,r,s,t,u\}$

$(P\cup Q)\cup R=\{m,n,o,p,q,r,s,t,u,v,w\}$

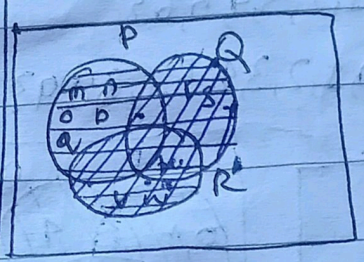


$P\cup Q$ = ▥

$(P\cup Q)\cup R$ = ▦

R.H.S

$P\cup(Q\cup R)$



$Q\cup R$ = ▥

$P\cup(Q\cup R)$ = ▦

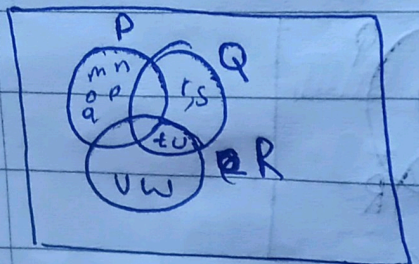
L.H.S = R.H.S

b) $(P\cap Q)\cap R = P\cap(Q\cap R)$

L.H.S

$P\cap Q=\{\}$

$(P\cap Q)\cap R=\{\}$



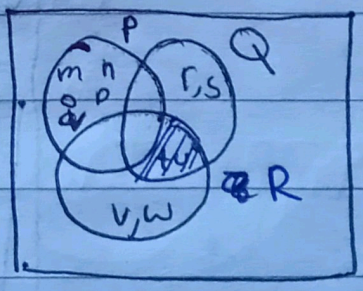
$P\cap Q$ = □

$(P\cap Q)\cap R$ = □ No shaded

R.H.S

$P\cap(Q\cap R)$

$Q\cap R=\{t,u\}$



$Q\cap R$ = ▥

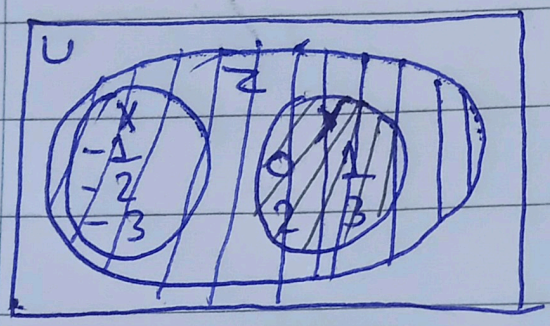
$P\cap(Q\cap R)$ = □ No shaded

Q6 $X=\{-1,-2,-3\}$ $Y=[0,1,2,3]$, $Z=\{0,\pm1,\pm2,\pm3\}$

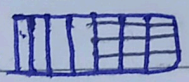
$X\cup(Y\cap Z)=(X\cup Y)\cap(X\cup Z)$

L.H.S

$X\cup(Y\cap Z)$

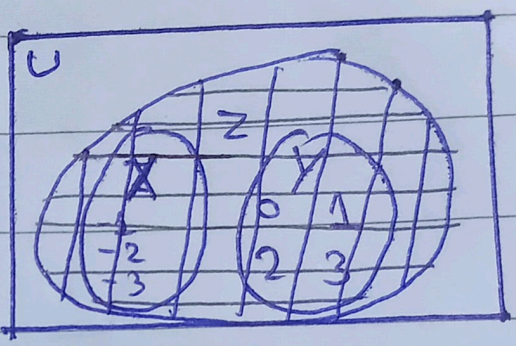


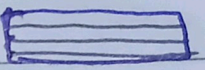
$Y\cap Z=$ 

$X\cup(Y\cap Z)=$ 

R.H.S

$(X\cup Y)\cap(X\cup Z)$



$X\cup Y=$ 

$X\cup Z=$ 

$(X\cup Y)\cap(X\cup Z)=$ 

L.H.S = R.H.S

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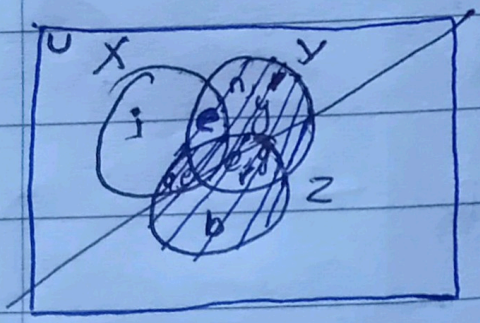
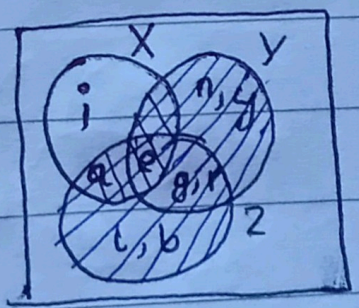
Q7 Verfy $X \cap (Y \cup Z) = (X \cap Y) \cup (X \cap Z)$

$X = \{a, e, i\}$, $Y = \{$Energy$\}$ $Z = \{$algebra$\}$



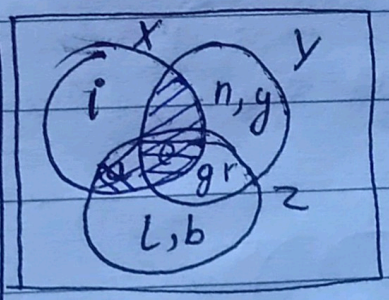


$Y \cup Z =$

$X \cap (Y \cup Z) =$

L.H.S = R.H.S.

R.H.S.



$X \cap Y =$

$X \cap Z =$

$(X \cap Y) \cup (X \cap Z) =$