Homework2

All questions carry equal marks – 10 marks each

Exercise Set 2.3, #9, page 61

						PREMISE			CONCLUSION
p	q	r	~q	~r	pΛq	pΛr->~r	pv~q	~q->p	~r
T	T	T	F	F	T	F	T	T	
T	T	F	F	T	T	T	T	T	T
T	F	T	T	F	F	T	T	T	F
T	F	F	T	T	F	T	T	T	T
F	T	T	F	F	F	T	F	T	
F	T	F	F	T	F	T	F	T	
F	F	T	T	F	F	T	T	F	
F	F	F	T	T	F	T	T	F	

This row shows that it is possible for an argument of this form to have a true premise but a false conclusion. Thus this argument form is invalid.

Exercise Set 2.3, #10, page 62

				PREMISE		CONCLUSION
p	q	r	pVq	p->r	q->r	pVq->r
T	T	T	T	T	T	T
T	T	F	T	F	F	
T	F	T	T	T	T	T
T	F	F	T	F	T	
F	T	T	T	T	T	T
F	T	F	T	T	F	
F	F	T	F	T	T	
F	F	F	F	T	T	

We have true conclusions for all true premises. Hence, it's a valid argument.

Exercise Set 2.3, #11, page 62

							PREMISE		CONCLUSION
p	q	r	~p	~q	~r	qVr	p->qVr	~qV~r	~pV~r
T	T	T	F	F	F	T	T	F	F
T	T	F	F	F	T	T	T	T	T
T	F	T	F	T	F	T	T	T	F
T	F	F	F	T	T	T	T	T	T
F	T	T	T	F	F	T	T	T	T
F	T	F	T	F	T	T	T	T	T
F	F	T	T	T	F	T	T	T	T
F	F	F	T	T	T	F	T	T	T

The highlighted row shows that it is possible for an argument of this form to have a true premise but a false conclusion. Thus this argument form is invalid.

Exercise Set 2.3, #28, page 62

Let p='There are as many rational numbers as irrational numbers'

q='set of all irrational numbers is infinite'

p->q

q=T

Hence, p=T

Invalid: Converse Error

Exercise Set 2.3, #29, page 62

Let p= 'At least one of these two numbers is divisible by 6'

q='Product of these two numbers is divisible by 6'

p->q

~p

Hence, ~q   Invalid: Inverse error

Exercise Set 2.3, #30, page 62

p->q

q=T

Hence, p=T

Invalid: Converse Error

Exercise Set 2.3, #38bc, page 63

b). Suppose C is a knight. Hence, C tells truth and C & D are knave. Hence, C is both Knight and knave ->Contradiction. Hence, C is a knave and always lies. Therefore, D is a Knight.

c). Suppose E is a knight. Therefore, he always tells the truth. Hence, F is knave. Therefore, F lies. Hence, E is not a knave. Either of the two is knight and the other is a knave.

Exercise Set 2.3, #40, page 63

Muscles killed Sharky.

Exercise Set 2.3, #42, page 63

1). q->r	by premise		
~r	by premise		
Hence, ~q	by Modes Tollens		
2). ~q ->u Λs	by premise		
~q	from (1)		
Hence, u Λs	by Modus Ponens		
3). u Λs	from (2)		
Hence, s	Specialization		
4). p Vq	premise		
~q	from (1)	Hence, p	Elimination

5).p	from (4)
s	from(3)
p Λs	Conjunction
6). p Λs->t	premise
p Λs	from (5)
t	Modus Ponens

Exercise Set 2.3, #44, page 63

1). ~q V s	by premise
~s	by premise
Hence, ~q	by elimination
2). p->q	by premise
~q	from(1)
Hence, ~p	by Modes Tollens
3). r V s	by premise
~s; Hence, r	by elimination
4). ~s -> ~t	by premise
~s	by premise
Hence, ~t	by Modus Ponens
5). ~p	from (2)
r	from (3)
Hence, ~p Λ r	by Conjunction
6). ~p Λ r->u	by premise
~p Λ r	from (5)
Hence, u	by Modus Ponens

7). $w \vee t$	by premise
$\sim t$	from (4)
Hence, w	by Elimination
8). u	from (6)
w	from (7)
Hence, $u \wedge w$	by Conjunction