

## Discrete structure Paper

Ans: Propositions are:

- (b) The apple Macintosh is a 16 bit computer
- (c) There is a largest even number.
- (e)  $8 + 7 = 13$
- (f)  $a + b = 13$

Ans  $P = x < 50, Q = x > 40$

- (a)  $\neg P = x \geq 50$
- (b)  $\neg Q = x \leq 40$
- (c)  $P \wedge Q = x < 50$  and  $x > 40$
- (d)  $P \vee Q = x < 50$  or  $x > 40$
- (e)  $\neg P \wedge Q = x \geq 50$  and  $x > 40$
- (f)  $\neg P \wedge \neg Q = x \geq 50$  and  $x \leq 40$

(3)  
Ans

- (a)  $P =$  "Some people like Maths"
- (a)  $\neg P =$  "Some people dislike Maths"
- (b)  $P =$  "The answer is either 2 or 3"
- (a)  $\neg P =$  "Neither 2 nor 3 is the answer"
- (b)  $\neg P =$  "The answer is not 2 or if is not 3"
- (c)  $\neg P =$  "The answer is not 2 and if is not 3"

(a) P = "All people in my class are tall and thin"  
 $\neg P$  = "No-one in my class is tall and thin"

Ans

(a)  $\neg P \vee \neg Q$

P	Q	$\neg P$	$\neg Q$	$\neg P \vee \neg Q$
T	F	F	T	T
F	T	T	F	T
T	F	F	T	T
F	T	T	F	T

(b)  $\forall \neg (\neg P \vee \neg Q)$

P	Q	$\neg P$	$\neg Q$	$\neg P \vee \neg Q$	$\forall \neg (\neg P \vee \neg Q)$
F	T	T	F	T	T
T	F	F	T	T	F
F	T	T	F	T	T
T	F	F	T	T	F

(c)  $P \wedge (Q \vee R)$

P	Q	R	$Q \vee R$	$P \wedge (Q \vee R)$
T	F	F	F	F
T	T	F	T	T
F	T	T	T	F
F	F	T	T	F

Q (P ∧ q) ∨ r

P	q	r	P ∧ q	(P ∧ q) ∨ r
F	T	F	F	F
F	F	F	F	F
T	T	F	F	F
T	F	T	T	T

Ans:  $\neg((P \vee \neg q) \vee (r \wedge (P \vee \neg q))) = \neg P \wedge q$

P	q	r	¬q	¬P	P ∨ ¬q	¬(P ∨ ¬q)
T	F	T	T	F	T	F
T	F	F	T	F	T	F
F	T	F	F	T	T	F
F	T	T	F	T	T	F



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

↓

$\neg(P \vee \neg q)$	$\neg P \wedge q$
T	T
T	F
F	F
F	F

voice moved.