**1.1 Propositional Logic**

Q18- **State the converse, contrapositive, and inverse of each of**

**these conditional statements.**

**a) If it snows today, I will ski tomorrow.**

Converse : I will ski tomorrow only if it snows today.

Contrapositive : if I don’t ski tomorrow, then it will not have snowed today.

Inverse : if it doesn’t snow today , I will not ski tomorrow.

**b) I come to class whenever there is going to be a quiz.**

Converse : I will come to class only if there is a quiz.

Contrapositive : if I didn’t come to class , then we will not going to have quiz.

Inverse : I will not come to class whenever we don’t have quiz.

**c) A positive integer is a prime only if it has no divisors**

**other than 1 and itself.**

Converse : if a positive integer has no division other than 1 and itself , then it is a prime.

Contrapositive : : if a positive integer has divisions other than 1 and itself , then it is not a prime.

Inverse : : if a positive integer is not prime , then it has divisions other than 1 and itself

**Q22. Construct a truth table for each of these compound propositions.**

**a) p ⊕ p**

|  |  |  |
| --- | --- | --- |
| **p** | **p** | **p ⊕ p** |
| T | T | F |
| F | F | F |

**b) p ⊕¬p**

|  |  |  |
| --- | --- | --- |
| **p** | **¬p** | **p ⊕¬p** |
| T | F | T |
| F | T | T |

**c) p ⊕¬q**

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **¬q** | **p ⊕¬q** |
| T | T | F | T |
| T | F | T | F |
| F | T | F | F |
| F | F | T | T |

**d) ¬p ⊕¬q**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p** | **q** | **¬p** | **¬q** | **¬p ⊕¬q** |
| T | T | F | F | F |
| T | F | F | T | T |
| F | T | T | F | T |
| F | F | T | T | F |

**e) (p ⊕ q) ∨ (p ⊕¬q)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **p** | **q** | **¬q** | **p ⊕ q** | **p ⊕¬q** | **(p ⊕ q) ∨ (p ⊕¬q)** |
| T | T | F | F | T | T |
| T | F | T | T | F | T |
| F | T | F | T | F | T |
| F | F | T | F | T | T |

**f ) (p ⊕ q) ∧ (p ⊕¬q)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **p** | **q** | **¬q** | **p ⊕ q** | **p ⊕¬q** | **(p ⊕ q) ∧ (p ⊕¬q)** |
| T | T | F | F | T | F |
| T | F | T | T | F | F |
| F | T | F | T | F | F |
| F | F | T | F | T | F |

**Q 28. What is the value of x after each of these statements is**

**encountered in a computer program, if x = 1 before the**

**statement is reached?**

**a) if x + 2 = 3 then x := x + 1**

x=2

**b) if (x + 1 = 3) OR (2x + 2 = 3) then x := x + 1**

x=1

**c) if (2x + 3 = 5) AND (3x + 4 = 7) then x := x + 1**

x=2

**d) if (x + 1 = 2) XOR (x + 2 = 3) then x := x + 1**

x=1

**e) if x < 2 then x := x + 1**

x=2