**Questão 1)** Verifique a validade dos seguintes argumentos utilizando tabela verdade

**(a)** p → q, (p →r) → s V q, p Λ q → r, ~s ├ q

((p → q) Λ ((p →r) → s V q Λ (p Λ q → r) Λ (~s))→ q

| p | q | r | s | p → q | (p →r) → s V q | p Λ q → r | ~s | q |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V | V | V | V | V | V | V | F | V |
| V | V | V | F | V | V | V | V | V |
| V | V | F | V | V | V | F | F | V |
| V | V | F | F | V | V | F | V | V |
| V | F | V | V | F | V | V | F | F |
| V | F | V | F | F | F | V | V | F |
| V | F | F | V | F | V | V | F | F |
| V | F | F | F | F | V | V | V | F |
| F | V | V | V | V | V | V | F | V |
| F | V | V | F | V | V | V | V | V |
| F | V | F | V | V | V | V | F | V |
| F | V | F | F | V | V | V | V | V |
| F | F | V | V | V | V | V | F | F |
| F | F | V | F | V | F | V | V | F |
| F | F | F | V | V | V | V | F | F |
| F | F | F | F | V | F | V | V | F |

**(b)** (q v p), ~q ├ p

(q v p) Λ ~q → p

| p | q | q v p | ~q | p |
| --- | --- | --- | --- | --- |
| V | V | V | F | V |
| V | F | V | V | V |
| F | V | V | F | F |
| F | F | F | V | F |

**(c)** p → q, r → s, p V s ├ q V r

p → q Λ r → s Λ p V s → q V r

| p | q | r | s | p → q | r → s | p V s | q V r |
| --- | --- | --- | --- | --- | --- | --- | --- |
| V | V | V | V | V | V | V | V |
| V | V | V | F | V | F | V | V |
| V | V | F | V | V | V | V | V |
| V | V | F | F | V | V | V | V |
| V | F | V | V | F | V | V | V |
| V | F | V | F | F | F | V | V |
| V | F | F | V | F | V | V | F |
| V | F | F | F | F | V | V | F |
| F | V | V | V | V | V | V | V |
| F | V | V | F | V | F | F | V |
| F | V | F | V | V | V | V | V |
| F | V | F | F | V | V | F | V |
| F | F | V | V | V | V | V | V |
| F | F | V | F | V | F | F | V |
| F | F | F | V | V | V | V | F |
| F | F | F | F | V | V | F | F |

**Questão 2)** Verifique a validade dos seguintes argumentos aplicando regras de inferência.

**(a)** p → q, (p →r) → s V q, p Λ q → r, ~s ├ q

1. p → q

2. (p →r) → s V q

3. p Λ q → r

4. ~s

5. p → p Λ q 1 – ABS

6. p → r 3,5 – SH

7. s V q 2,6 – MP

8. q 4,7 – SD

**(b)** (q v p), ~q ├ p

1. (q v p)

2. ~q

3. p 1,2 - SD

**(c)** p → q, ~r → (s → t), r V (p V s), ~r ├ q V t

1. p → q

2. ~r → (s → t)

3. r V (p V s)

4. ~r

5. s → t 2,4 – MP

6. p V s 3,4 - SD

7. q V t 1,5,6 – DC

**(d)** p → q, p V (~~r Λ ~~q), s → ~r, ~(p Λ q)├ ~s V ~q

1. p → q

2. p V (~~r Λ ~~q)

3. s → ~r

4. ~(p Λ q)

5. p → p Λ q 1 – ABS

6. ~p 4,5 – MT

7. ~~r Λ ~~q 2,6 – SD

8. ~~r 7 – SIMP

9. ~s 3,8 – MT

10.~s V ~q 9 - AD

**(e)** p → r, q → s, ~r, (p V q) Λ (r V s) ├ s

1. p → r

2. q → s

3. ~r

4. (p V q) Λ (r V s)

5. p V q 4 – SIMP

6. r V s 1,2,5 – DC

7. s 3,6 - SD

**(f)** p →q, q → r, r → s, ~s, p V t ├ t

1. p →q

2. q → r

3. r → s

4. ~s

5. p V t

6. p → r 1,2 – SH

7. p → s 3,6 – SH

8. ~p 4,7 – MT

9. t 5,8 - SD

**(g)** (p → q)Λ(r→s), t→u, u → v, ~q V ~v ├ ~p V ~t

1. (p → q)Λ(r→s)

2. t→u

3. u → v

4. ~q V ~v

5. t → v 2,3 – SH

6. p → q 1 – SIMP

7. ~p V ~t 4,5,6 - DD