**Question 4 [12 marks]:**

Let P, Q and R be propositions. Determine the validity of the following compound proposition: 𝑅 ⇒ [(𝑃 ∧ 𝑄)≡ (𝑃 ∨ ~𝑅)]

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| P | Q | R | ~R | P∧Q | P V ~R | (P∧Q) ≡ (P V ~R) | R =>((P∧Q) ≡ (P V ~R)) |
| T | T | T | F | T | T | T | T |
| T | F | T | F | F | T | F | F |
| F | T | T | F | F | F | T | T |
| F | F | T | F | F | F | T | T |
| T | T | F | T | T | T | T | T |
| T | F | F | T | F | T | F | T |
| F | T | F | T | F | F | T | T |
| F | F | F | T | F | F | T | T |

Since the last column is not all true, the proposition [R =>((P∧Q) ≡ (P V ~R))] is not valid.