SECTION – I

Q2

Sol 1. Tautology : Tautology is defined as a Compound proposition that is always true for all possible truth values of it's propositional variables and it contain T in last column of its truth table.
Propositions like,

(i) The doctor is either male or female.
(ii) Either it is raining or not.
are always true and are tautologies.

2. Contradiction : Contradiction is defined as a Compound proposition that is always false for all possible truth valve of its propositional variables and it contains F in last column of its truth table.
Propositions like,

(i) x is even and x is odd number
(ii) Tom is good boy and Tom is bad boy.
are always false and are Contradiction.

3. Contingency: A Proposition which is neither tautology nor Contradiction is called Contingency.
Here the last column of truth table Contains both T and F.

⇒ Proof: $((P \vee Q) \vee (\sim P \vee R)) \rightarrow (Q \vee R)$

P	Q	R	~P	(P ∨ Q) = A	(~P ∨ R) = B	(A ∨ B) = C	(Q → R) = D	C → D
F	F	F	T	F	T	T	F	F
F	F	T	T	F	T	T	T	T
F	T	F	T	T	T	T	T	T
F	T	T	T	T	T	T	T	T
T	F	F	F	F	F	T	F	F
T	F	T	F	T	T	T	T	T
T	T	F	F	T	F	T	T	T
T	T	T	F	T	T	T	T	T

So, $((P \vee Q) \vee (\sim P \vee R)) \rightarrow (Q \vee R)$ is Contingency.