Construct the truth table for the following statements:

i) (~p ∧ q) ∨ p

p	q	~p	~p ∧ q	(~p ∧ q) ∨ p
T	T	F	F	T
T	F	F	F	T
F	T	T	T	T
F	F	T	F	F

Contd.

Construct the truth table for the following statement:

ii) $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$

p	q	p→q	~q	~p	~q→~p	(p→q) ↔ (~q→~p)
T	T	T	F	F	T	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

Contd.

Consider the statements

p: " I will study Discrete Mathematics".

q: "I will go to a movie".

r: "I am in a good mood".

Write the following statements in terms of p,q,r and logical connectives. Construct the truth table for each of them.

a) *"If I am not in good mood then I will go to a movie else I will study Discrete Mathematics".*

(~r→q) ∨ p

Contd.

b) *"If I am in a good mood then either I will study Discrete Mathematics or I will not go to a movie else I will go to a movie".*

$(r \rightarrow (p \vee \sim q)) \vee q$

c) *"I will not go to a movie and I will study Discrete Mathematics iff I am in a good mood".*

$r \leftrightarrow (\sim q \wedge p)$

Contd.

a) Truth table of (~r→q) V p

p	q	r	~r	~r→q	(~r→q) V p
T	T	T	F	T	T
T	T	F	T	T	T
T	F	T	F	T	T
T	F	F	T	F	T
F	T	T	F	T	T
F	T	F	T	T	T
F	F	T	F	T	T
F	F	F	T	F	F

Contd.

b) Truth table of (r→(p ∨ ~q)) ∨ q

p	q	r	~q	p∨~q	r→p∨~q	(r→(p ∨ ~q)) ∨ q
T	T	T	F	T	T	T
T	T	F	F	T	T	T
T	F	T	T	T	T	T
T	F	F	T	T	T	T
F	T	T	F	F	F	T
F	T	F	F	F	T	T
F	F	T	T	T	T	T
F	F	F	T	T	T	T

Contd.

\# Consider the following statements:

p: *"The flood destroys my house."*

q: *"The fire destroys my house."*

 r: *"My insurance company will pay me."*

Write down the following statements in terms of p, q, r.

a) *"If the flood destroys my house or the fire destroys my house then my insurance company will pay me."*

Ans. **(p ∨ q)➜ r**

b) *"If my insurance company pays me then the flood destroys my house or the fire destroys my house."*

Ans. **r ➜ (p ∨ q)**

Contd.

c) *"If neither the flood destroys my house nor the fire destroys my house then my insurance company will not pay me."*

Ans. **(~p ∧ ~q) → ~r**

d) *"If my insurance company does not pay me then the flood does not destroy my house or the fire does not destroy house."*

Ans. **~r → (~p ∨ ~q)**

e) *"If my insurance company does not pay me then the flood does not destroy my house and fire does not destroy my house."*

Ans. **~r →(~p ∧ ~q)**