Student Id: 1705091

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Chapter: 1

Section: 1

Exercise No: 11

Exercise: Let p and q be the propositions

p: It is below freezing

q: It is snowing

Write these propositions using p and q and logical connectives (including negations).

(a) It is below freezing and snowing.

⇒ $p \wedge q$

(b) It is below freezing but not snowing.

⇒ $p \wedge \neg q$

(c) It is not below freezing and it is not snowing.

⇒ $\neg p \wedge \neg q$

(d) It is either snowing or below freezing.

⇒ $p \vee q$

(e) If it is below freezing, it is also snowing.

⇒ $p \rightarrow q$

(f) Either it is below freezing or it is snowing, but it is not snowing if it is below freezing.

$\Rightarrow (p \vee q) \wedge (p \rightarrow \neg q)$

(g) That it is below freezing is necessary and sufficient for it to be snowing.

$\Rightarrow p \leftrightarrow q$