



Given

$$\begin{aligned}
 & (p \wedge (p \rightarrow q)) \rightarrow q \\
 \equiv & (p \wedge (\neg p \vee q)) \rightarrow q && \text{Definition of implication} \\
 \equiv & (\underbrace{p \wedge \neg p}_F \vee (p \wedge q)) \rightarrow q && \text{Distributive law} \\
 \equiv & (F \vee (p \wedge q)) \rightarrow q \\
 \equiv & (p \wedge q) \rightarrow q \\
 \equiv & \neg(p \wedge q) \vee q && \text{Definition of implication} \\
 \equiv & \neg p \vee \underbrace{\neg q \vee q}_T && \text{DeMorgan's law} \\
 \equiv & \neg p \vee T && \text{Tautology} \\
 \equiv & T && \text{So, it is tautology}
 \end{aligned}$$



(If) $\frac{p}{\text{you are happy}}$ and $\frac{q}{\text{watch movies}}$, (then) $\frac{\text{your parents ask you to study}}{r}$

So, we obtain

$$(p \wedge q) \rightarrow r$$

$\frac{q}{\text{You will find a good job in Pathao when you learn CSE173,}}$
 $\frac{p}{\text{P}}$

So, we obtain

$$p \rightarrow q$$

← This is another form of ~~imp~~ conditional statement



Given

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

(2)

p	q	r	$\neg r$	$\neg q$	$p \vee \neg r$	
T	T	T	F	F	T	T
T	T	F	T	F	T	T
T	F	T	F	T	T	T
T	F	F	T	T	T	T
F	T	T	F	F	F	T
F	T	F	T	F	T	F
F	F	T	F	T	T	T
F	F	F	T	T	T	T

It is a contingency



$\overbrace{\text{You are a Bangladeshi}}^B$ (or) $\overbrace{\text{if you are not a Bangladeshi, then your friend is European.}}^{\neg B \rightarrow E}$

So, $B \vee (\neg B \rightarrow E)$