Question 17: (1) $P \vee Q \vee R$

(2) $\neg Q \vee R$

(3) $Q \vee \neg R$

(4) $\neg P \vee \neg Q \vee \neg R$

(5) $\neg Q$

(6) $\neg P \vee Q \vee R$

(a) If $Q = 0$, then (5) is true

Put in (3), $Q \vee \neg R$

$0 \vee \neg R$

$0 \vee 1$

$= 1$ $\therefore R$ should be 0

Put in (2), $\neg Q \vee R$

$1 \vee 0$

$= 1$ is true

Now, (5), (2), (3) are true when $Q = 0, R = 0$

Put in (4) $\neg P \vee 1 \vee 1 = 1$ is true when value of P doesnot matter

Put in (6) $\neg P \vee 0 \vee 0$

$\therefore \neg 0$ makes it true, $\neg P = 1$

$\therefore P = 0$

Put in (7) $0 \vee 0 \vee 0$

which is false. Hence, UNSAT.

(b) (2) and (1)

$$\frac{\dfrac{\dfrac{\dfrac{\neg Q \vee R \qquad P \vee Q \vee R}{P \vee R} \qquad \neg P \vee Q \vee R}{Q \vee R} \qquad \neg Q \vee R}{R} \qquad Q \vee \neg R}{Q} \qquad \neg Q$$

$$\phi$$

$\therefore$ There set of clauses are UNSAT Because we get ϕ in the end.