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1. A. Driver $X = \neg Y \wedge Z$, Driver $Y = X \leftrightarrow Y$, Driver $\neg X \vee \neg Y$

B.

X	Y	Z	X's report	Y's report	Z's report
T	T	T	F	T	F
T	F	T	T	F	T
F	T	T	F	F	T
F	F	T	T	T	T
T	T	F	F	T	F
T	F	F	F	F	T
F	T	F	F	F	T
F	F	F	F	T	T

C. Drivers X & Y are not working while Driver Z is working

D. Status report X & Z are false.

2. A. If $m = p$ then $(m,n) = (P,Q)$, False, n could not equal Q

False - B. If (m,n) does not equal (P,Q), then m does not equal P. False, m and n can be equal

C. If m does not equal p, then (m,P) does not equal (P,Q), true, contrapositive

3. A. $(Q \vee r) \rightarrow \neg P$

B. $P \rightarrow (\neg Q \wedge \neg r)$

C. You can drink alcohol if you are not under 21 years old and you are not operating machinery

4. $D \leftrightarrow (C \wedge P \wedge \neg T)$

5. A. $(P \vee Q) \wedge (P \vee \neg Q) \wedge (\neg P \vee Q)$

P	Q			
T	T	T	T	T
T	F	T	F	F
F	T	F	T	T
F	F	F	T	T

Satisfiable if both P and Q are true

B

P	Q	$(P \vee Q) \wedge (P \vee \neg Q) \wedge (\neg P \vee Q) \wedge (\neg P \vee \neg Q)$			
T	T	T	T	F	F
T	F	T	T	F	T
F	T	T	F	T	T
F	F	F	T	T	T

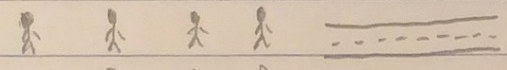
Unsatisfiable because there is a combination of all $P, \neg P, Q,$ and $\neg Q$ in the statement. So there is no value of P and Q where the statement can be justified.

6. A S = $[\neg(P \to Q)] \vee [\neg(P \vee Q)]$

P	Q	$(P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$		S
T	T	F	F	F
T	F	T	F	T
F	T	F	F	F
F	F	F	T	T

B. $(P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$

7. A.



		People across	Time elapsed
First	A B →	A, B	2
Second	← B	A	4
Third	C D →	A, C, D	14
Fourth	← A	C, D	15
Fifth	A B →	(A, B, C, D)	(17)