(A) Express all problem facts as a propositional logic knowledge base. Clearly explain the meaning of your propositional symbols.

A: Amy is a truth-teller
B: Bob is a truth-teller
C: Cal is a truth-teller

Knowledge Base:

1. $A \Leftrightarrow (C \wedge A)$
2. $B \Leftrightarrow (\neg C)$
3. $C \Leftrightarrow (B \vee \neg A)$

(B) Convert the propositional logic knowledge base to CNF.

KB $\Rightarrow$ CNF:
$\{(A \Leftrightarrow (C \wedge A)), (B \Leftrightarrow (\neg C)), (C \Leftrightarrow (B \vee \neg A)), \}$
Eliminate $\Leftrightarrow$
$\{(A \Rightarrow (C \wedge A)), (C \wedge A) \Rightarrow A), (B \Rightarrow \neg C), (\neg C \Rightarrow B), (C \Rightarrow (B \vee \neg A)), ((B \vee \neg A) \Rightarrow C)\}$
Eliminate $\Rightarrow$
$\{(\neg A \vee (C \wedge A)), (\neg(C \wedge A) \vee A)), (\neg B \vee \neg C), (C \vee B), (\neg C \vee (B \vee \neg A)), (\neg(B \vee \neg A) \vee C)\}$
Move $\neg$ inward
$\{(\neg A \vee (C \wedge A)), ((\neg C \vee \neg A) \vee A)), (\neg B \vee \neg C), (C \vee B), (\neg C \vee (B \vee \neg A)), ((\neg B \wedge \neg A) \vee C)\}$
Distribute $\vee$ over $\wedge$
$\{((\neg A \vee C) \wedge (\neg A \vee A)), ((\neg C \vee \neg A) \vee A)), (\neg B \vee \neg C), (C \vee B), (\neg C \vee (B \vee \neg A)), ((\neg B \vee C) \wedge (\neg A \vee C))\}$
Rewrite as conjunction of known sentences:
$\{\{\neg A, C\},$
$\{\neg C\}$
$\{\neg B, \neg C\}$
$\{C, B\},$
$\{\neg C, B, \neg A\}$
$\{\neg B, C\}\}$