Practice First Examination

Note: The real first exam will have the following format, with a few more or a few less problems in each section. I may reallocate point values among the various sections. See further notes below.

Part A. Symbolization (20 points) Symbolize the following sentences using the symbolization scheme below.

A: Anita wants to be a millionaire.
B: Bradley won $10,000.
C: The capital of Burkina Faso is Ouagadougou.
E: Eve won $10,000.
H: The one hundred dollar question is “Who is buried in Grant’s tomb?”
M: The Mossi Empire’s capital was Ouagadougou.

1. Anita wants to be a millionaire only if the one hundred dollar question is “Who is buried in Grant’s tomb?”
2. Neither Eva nor Bradley won $10,000.
3. If Ouagadougou is the capital of both Burkina Fasso and the Mossi Empire, then Eva and Bradley did not both win $10,000.

Part B. Translation (10 points) Translate the following symbolic sentence into idiomatic English, using the scheme of symbolization provided above.

4. \((C \rightarrow B) \rightarrow (\neg E \& \neg H)\)
Part C. Truth Table Problems (30 points)

9. Truth-functional consistency
   (a) State whether the following set of sentences is truth-functionally consistent.
   (b) Provide a complete truth table (with our standardized arrangement of truth values
       and rows) that will help justify your claim.
   (c) State clearly why your truth table justifies your claim in (a).

   \[ D \& \neg(T \rightarrow F), \quad D \rightarrow F \]

10. Validity
    (a) State whether the argument is valid.
    (b) Provide a complete truth table that will help justify your claim.
    (c) State clearly why your truth table justifies your claim in (a).

   \[ (Q \lor R) \rightarrow S, \quad (S \lor Q) \rightarrow R, \quad \therefore R \rightarrow S. \]

   Note: I may instead have a problem concerning the equivalence of two sentences, rather than a
   question about validity or a question about consistency.

Part D. Derivations (40 points)
Provide derivations showing that the following arguments are valid.
(Note: You will get more points for a derivation that is unfinished but correct as far as it goes
than for one that is finished but misuses the rules. You will get some points for starting a
derivation in a promising direction, even if you do not finish it.)

11. \[ \neg L \lor K. \quad X \rightarrow \neg L. \quad \neg X \quad \therefore \neg K \rightarrow V \]

12. \[ \neg (O \land N) \rightarrow (R \lor O). \quad R \rightarrow \neg N. \quad \therefore \neg O \rightarrow (N \rightarrow P) \]