1. Digital Electronics

List all of the following statements that are true about the circuit above.

- a. It is TRUE for all possible inputs.
- b. It is FALSE for all possible inputs
- c. It is TRUE only when the two inputs are different.
- d. It is sometimes TRUE when the two inputs are different.
- e. It is FALSE whenever B is TRUE.

2. Prefix/Postfix
Convert the following postfix expression into prefix.

AAB + CAB / / *

3. Prefix/Postfix
The volume of a sphere is given by the formula \( V = \frac{4}{3} \pi R^3 \). Translate the formula, as written above, into prefix.

4. Data Structures
Consider the following operations on an initially empty queue. If a POP is now performed, what value would be popped?

- PUSH (B)
- PUSH (D)
- PUSH (I)
- POP (X)
- PUSH (N)
- PUSH (S)
- POP (X)

5. Data Structures
Insert the key “VULCAN” into the following binary search tree. What is the new external path length?