

On each TRUE-FALSE question below, there are four valid answers. If the correct answer is TRUE, then TRUE earns 3 points, TRUISH earns 2 points, FALSISH earns 1 point, and FALSE earns 0 points. If the correct answer is FALSE, then these point values are of course reversed. Do not write just T or F; write your answer completely and clearly. No explanation is needed! Wherever it appears,  $M$  refers to a (deterministic, one-tape) Turing machine. You have 10 minutes to complete this portion of the exam.

**A.** If  $A$  is a language whose complement  $A^c$  is finite, then  $A$  is decidable.

**B.** If  $N$  is the Turing machine obtained by switching the accept and reject states of  $M$ , then  $L(N) = L(M)^c$ .

**C.** If  $M$  is in state  $q$  and sees tape symbol  $a$ , and later is again in state  $q$  and sees tape symbol  $a$ , then it can be concluded that  $M$  is in a loop and will not halt.

**D.** If  $A$  is decidable and  $B$  is context-free, then  $A \cap B$  is decidable.

**E.** The language  $\{\langle N \rangle : N \text{ is a TM whose start state has no incoming transitions}\}$  is decidable.