9.22

(a) by definition: p-value of the test is $P(T>t) = 1-F(t)$
t is observed value of T

So p-value: $V = 1-F(T)$

(b) T is continuous random variable with cdf $F(t)$
So by Proposition C of section 2.3, $F(T) \sim \text{Uniform}(0,1)$

$P(V \le x) = P(1-F(T) \le x) = P(F(T) \ge 1-x) = x \quad 0 \le x \le 1$

$\therefore V \sim \text{Uniform}(0,1)$

(c) If H_0 is true, from part (b), we know $V \sim U(0,1)$
So $P(V > 0.1) = 0.9$

(d) If H_0 is true, then $V \sim U(0,1)$

$P(V < \alpha) = \alpha$