

**MATH10282: INTRODUCTION TO STATISTICS**  
**SEMESTER 2**  
**QUIZ PROBLEM 10**  
**(Deadline: Friday 13 May 2022, 11:00am)**

Suppose  $X_1, \dots, X_n$  is a random sample from a distribution specified by the cumulative distribution function  $F(x) = (x/K)^a$  for  $a > 0$  and  $0 \leq x \leq K$ , where  $a$  is known. Consider testing  $H_0 : K = K_0$  versus  $H_1 : K > K_0$ . Suppose we reject  $H_0$  when  $T = \max(X_1, \dots, X_n) < c$  for some constant  $c < K$ . The sample size  $n$  such that the probability of type II error is less than or equal to a pre-specified  $\beta$  must satisfy

a)  $n \geq \frac{\log \beta}{a \log\left(\frac{c}{K}\right)}.$

b)  $n \leq \frac{\log \beta}{a \log\left(\frac{c}{K}\right)}.$

c)  $n \leq \frac{\log(1-\beta)}{a \log\left(\frac{c}{K}\right)}.$

d)  $n \geq \frac{\log(1-\beta)}{a \log\left(\frac{c}{K}\right)}.$

**This problem is worth 1 mark. Marking scheme: 1 mark if the answer is correct, 0 mark if the answer is incorrect.**

**Please use Blackboard to enter your answer.**