1. Find the moment generating function corresponding to the following p.d.f

(a) $f(x)=\frac{1}{2\beta}e^{-|x-\alpha|/\beta}$, $-\infty<x<\infty$, $-\infty<\alpha<\infty$, $\beta>0$ (10%)

(b) $P(X=x)=\binom{r+x-1}{x}p^r(1-p)^x$, $x=0,1,\ldots$, $0<p<1$, $r>0$ an integer (10%)

2. Suppose X represents a single observation from the following p.d.f

$f(x)=\theta x^{\theta-1}$, $0<x<1$; $f(x)=0$, otherwise.

Find the most powerful test with significance level α=0.05 to test H_0: θ=1 versus H_a: θ=2 (15%)

3. Let $X_1, X_2, \ldots, X_n$ be a random sample from

$f(x)=\theta x^{-2}$, $0<\theta\leq x<\infty$.

(a) What is a sufficient statistic for θ? (5%)

(b) Find the maximum likelihood estimator of θ. (5%)

(c) Find the method of moments estimator of θ. (5%)

4. Define: (25%)
   (a) random experiment, probability set function and random variable.
   (b) method of least squares and method of maximum likelihood.
   (c) sufficiency, consistency and efficiency.
   (d) type I error, type II error and power function.
   (e) uniformly most powerful test and likelihood ratio test.

5. State the Central Limit Theorem. (5%)

6. State the Rao-Blackwell Theorem. (10%)

7. State the Neyman-Pearson Theorem. (10%)

試題隨卷繳回