# 國立臺北大學 108 學年度日間學士班轉學生招生考試試題

學制系級：統計學系日間學士班 3 年級

科　　目：機率論



☐可 ☑不可使用計算機

1. (35 points) The random variable X has the moment generating function

$$M(t) = \sum_{x=0}^{4} \left(\frac{3 - |x-2|}{k}\right) e^{tx}.$$

(a) Write down the space of X.

(b) Find k.

(c) Sketch the C.D.F. of X.

(d) Calculate EX and VarX.

(e) Calculate $\Pr(X < 3)$.

(f) Let $Y = X^2$. Find the p.m.f. of Y.

2. (30 points) Let X and Y have the joint p.d.f.

$$f(x,y) = kx^2 e^{x-y}, 0 < x < \infty, 2x < y < 3x.$$

(a) Find k.

(b) Find the marginal p.d.f. of X.

(c) Find EX.

(d) Are X and Y independent? Explain your answer.

3. (35 points) Let X and Y have the joint p.d.f.

$$f(x,y) = \frac{1}{64} xy^2 \exp\left(\frac{-(x+y)}{2}\right), \qquad 0 < x,y < \infty.$$

(a) Are X and Y independent? Explain your answer.

(b) Calculate $\Pr(X > 3)$.

(c) Let $Z = X/Y$. Find the marginal p.d.f. of Z.

試題隨卷繳交