

國立高雄第一科技大學 97 學年度 碩士班 招生考試 試題紙

系 所 別：電腦與通訊工程系

組 別：通訊組

考科代碼：2111

考 科：機率

注意事項：

- 1、本科目可使用本校提供之電子計算器。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

不可以使用字典

1. Suppose a point is selected at random from inside a circle. The radius of the circle is 2. Let random variable Y be the distance of the point from the origin.
 - a. Find the sample space of Y , $S_Y=?$ (10 points)
 - b. Find $P[Y \leq y]=?$ (10 points)
2. Gaussian Random Variable X with mean μ and variance σ^2 , write down the probability density function $f_X(x)$. (10 points)
3. Random variable X is uniformly distributed in the interval $[a, b]$. Find the mean and the variance of the random variable X . (10 points)
4. If X_1, \dots, X_n are independent normal random variables and $X_i=N(u_i, \sigma_i^2)$, where u_i is the mean and σ_i^2 is the variance for X_i . Let $Y=X_1+\dots+X_n$, find the mean of Y and variance of Y . (10 points)
5. Let random variable $Y=X^2$, find the probability density function $f_Y(y)$ in terms of the probability density function $f_X(x)$. (10 points)

6. Suppose a fair coin is tossed three times and let random variable X be the number of head in this random experiment. Write down the cumulative distribution function $F_X(x)=?$ (10 points)
7. The probability density function of exponentially distributed random variable X with parameter λ is $f_X(x)=\lambda e^{-\lambda x}$, $x \geq 0$. Find $E[X^2]=?$ (10 points)
8. The random vector variable (X, Y) has the joint probability density function $f(x, y) = k(x + y)$, $0 < x < 2$, $0 < y < 2$.
- $k=?$ (10 points)
 - Find $f_X(x|y)$. (10 points)