注意：本試卷共有四頁。請考生答題前，務必閱讀每大項的注意事項說明！

第一部份：填空題（每格 **5** 分，共 **50** 分）

（**1**）請不要使用「選擇題作答區」作答。

（**2**）第一部分為填空題，共有 **10** 個空格，每一空格 **5** 分；此部分不須計算過程。

（**3**）如果沒有特別指示，請將答案約分至「最簡分數」表示，否則不予計分。

（**4**）請自行製作答題區。規定如下：請於作答區第一頁「選擇題作答區」的下面製作第 **1－10** 格答題區。

（**5**）答題不要求任何計算過程，只依答案格內的答案對錯給分。

（**6**）第一頁第一部分之答題區格式如下：

第 1 格	第 2 格	第 3 格	第 4 格	第 5 格
第 6 格	第 7 格	第 8 格	第 9 格	第 10 格

Part I：填空題

A. Bowl B_1 contains 2 white chips; bowl B_2 contains 2 green chips; bowl B_3 contains 2 white and 2 green chips; and bowl B_4 contains 3 white chips and 1 green chip. The probabilities of selecting bowl B_1, B_2, B_3, or B_4 are 1/2, 1/4, 1/8, and 1/8, respectively. A bowl is selected using these probabilities and a chip is then drawn at random. The probability of drawing a **white** chip, P(W) =__**(1)**__. The conditional probability that bowl B_1 had been selected, given that a **white** chip was drawn, $P(B_1|W)$ =__**(2)**__.

（請翻次頁，繼續作答）

B. If $n = 10$, $\sum x = 20$, and $\sum x^2 = 121$, the mean for the sample is __(3)__ and the standard deviation for the sample is __(4)__.

C. If the moment-generating function of X is: $M(t) = \frac{2}{5}e^{t} + \frac{1}{5}e^{2t} + \frac{2}{5}e^{3t}$, the mean of X is __(5)__ and the variance of X is __(6)__.

D. A random sample of size $n = 75$ measurements is drawn from a binomial population with probability of success 3/4. The mean of the sampling distribution of the sample proportion $\hat{p}$ is __(7)__ and the standard deviation of the sampling distribution of the sample proportion is __(8)__. In addition, the shape of the sampling distribution of $\hat{p}$ is __(9)__. The standard normal z-score corresponding to a value of $\hat{p} = 0.65$ is __(10)__.

(請翻次頁，繼續作答)

注意：(1) Part II 有二大題計算問答說明題，請從答案卷第二頁之後作答。
(2) 請標示清楚，並將所有過程、步驟交代清楚；沒有說明過程者，甚者只給簡單回答如 Yes、No 等，不給分。每大題之下的小題分數，如括號內所示。

Part II：計算問答說明題（50 分）

Note: You should carefully state the reasons or calculations in the following questions in order to get the points. A short answer, such as "Yes" or "No" will NOT receive any point.

A. Consider the regression model

$$Y_i = \beta_0 + u_i,\ \ i = 1, \ldots, n$$

where $u_i \sim N(0, z_i\sigma^2)$ and $z_i's$ are non-random.

(a) What assumptions do we have to impose to implement the ordinary least squares (OLS) method for estimating the model ? (5%)

(b) Find out the OLS estimator $\hat{\beta}_0$ of β_0. (10%)

(請翻次頁，繼續作答)

B. Let $X_1, X_2, \ldots, X_n$ be a random sample from $N(\mu, \sigma^2)$. Given the level of significance α, please answer the following questions:

(a) Describe how you would find the moment estimators of μ and σ^2. (10%)

(b) Describe how you would find the maximum likelihood (ML) estimators of μ and σ^2. (10%)

(c) Compare your answers in (a) and (b). Are the moment and ML estimators different? Why or Why not? (5%)

(d) Explain how you would test the hypothesis $H_0: \mu \geq \mu_0$, where μ_0 is a known constant. (5%)

(e) Describe how you would construct a confidence interval for the unknown variance σ^2. (5%)