國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：統計學【財管系碩士班甲組、乙組、丙組】

注意事項：各題的計分方式與配分不完全相同，請參考各部份開頭說明。

第一部份：**複選題**（第 1-5 題，總共 60 分，每題 12 分且各有 5 個選項，每錯一選項扣 3.2 分，至多倒扣至該小題分數為零分；得分低於零分或所有選項均未作答者，該題以零分計。）

提醒：若無特別說明，母體皆為常態分配。表格中出現(??)或空白是指表格原有這些文字或符號或數據，作答時若有用到需自行判斷或計算。

1. 假設一箱子中放入四個球，各球寫上(i)、(ii)、(iii)、(iv)與不同名詞或文字，以下敘述哪些或哪一項正確？

   (A) 四個球分別寫上(i) 營業費用、(ii) 稅前淨利、(iii) 每股盈餘、(iv) 保留盈餘，從四個球中任取一球，該球名詞屬於「綜合損益表」常見項目的機率為 0.75。

   (B) 四個球分別寫上(i)流動資產、(ii) 應付帳款、(iii) 股東權益、(iv)投資活動現金流量，從四個球同時任取兩球，這兩球名詞至少有一項為「資產負債表」常見項目的機率為5/6。

   (C) 四個球分別寫上(i) 降低存款準備率、(ii) 調降重貼現率、(iii) 中央銀行透過民間賣出債券、(iv)減稅，從四個球同時任取兩球，這兩球文字皆屬於「寬鬆型貨幣政策」的機率為1/6。

   (D) 四個球分別寫上(i) 供給面生產過剩、(ii) 商品與勞務的總需求高於總供給、(iii) 減少公共部門支出、(iv) 提高銀行存款利率，從四個球同時任取三球，這三球文字概念恰有一項「會助長通貨膨脹」的機率為 0.5。

   (E) 以上皆非。

2. 某銀行研究者以 S、T 兩家百貨公司辦理聯名信用卡且年齡為 35~40 歲客戶的去年年薪作為兩群母體，想了解兩母體平均數是否顯著不同。經由客戶同意後，於 S、T 兩家公司分別取得 200 位符合條件客戶去年年薪數據（單位為萬元），S_data 為來自 S 公司的樣本、T_data 為來自 T 公司的樣本。使用 R 語言進行分析，下頁表一至表四為報表節錄內容。給定顯著水準為 5%，以下敘述哪些或哪一項正確？

   (A) 由表一可知：兩母體變異數沒有顯著不同。

   (B) 兩組樣本之平均數差絕對值為 2.625（單位為萬元）。

   (C) 表二是檢定「兩母體平均數是否顯著不同」之最正確表格。

   (D) 檢定「兩母體平均數是否顯著不同」之最正確表格中，t 分配自由度計算方式為 400-2。

   (E) 由於 S、T 兩家百貨公司之樣本數皆為 200，因此理論上可使用 Paired t-test 檢定「兩母體平均數是否顯著不同」。

表一：用於回答第 2 題

```
F test to compare two variances
data: S_data and T_data
F = (??),    num df = 199,    denom df = 199,    p-value = (??)
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.5717414      0.9982810
```

表二：用於回答第 2 題

```
Two Sample t-test
data: S_data and T_data
t = (??),    df = (??),    p-value = (??)
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -4.6224      -0.6276
```

表三：用於回答第 2 題

```
Welch Two Sample t-test
data: S_data and T_data
t = (??),    df = (??),    p-value = (??)
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -4.6225      -0.6275
```

表四：用於回答第 2 題

```
Paired t-test
data: S_data and T_data
t = -2.813,    df = (??),    p-value = (??)
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -4.4651      -0.7849
```

3. 考慮簡單迴歸模型 $Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$，$\varepsilon_i$ 為誤差項且服從常態分配，以下敘述哪些或哪一項正確？（請留意：本題(A)、(B)不需考慮表五，(C)、(D)、(E)請考慮表五。）

(A) 修正後判定係數(Adjusted R-squared)開根號後得到的值，為「應變數與自變數樣本數據之間」的相關係數絕對值。

(B) 以公司資產報酬率(Return on Assets；定義為淨利除以總資產)作為應變數 Y_i、公司總資產取自然對數之值作為 x_i，可得到 β_1 的估計值為負數。

(C) 使用 R 語言分析得到表五，若(甲)為 2.205，則(丙) = 2.205^2。

(D) 理論上，表五的(乙)等於(丁)。

(E) 令 $\rho =$ 應變數與自變數之間母體相關係數，考慮假說檢定：$H_0: \rho = 0$ vs. $H_1: \rho \neq 0$，以及顯著水準為 5%，即使表五提供完整的數字資訊，仍無法由表五得到拒絕或不拒絕虛無假說之結論。

表五：用於回答第 3 題

```
Call:
lm(formula = y ~ x)

Coefficients:
             Estimate      Std. Error      t value      Pr(>|t|)
(Intercept)  (??)          (??)            (??)         (??)
x            (??)          (??)            (甲)         (乙)
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: (??) on (??) degrees of freedom
Multiple R-squared:  (??),   Adjusted R-squared:  (??)
F-statistic: (丙) on (??) and (??) DF,  p-value: (丁)
```

4. 研究者邀請尚未用過網路銀行系統（以下簡稱網銀系統）且年齡為 25~30 歲的消費者，隨機到 L、S、T、W 四家銀行中任一家開戶並使用該銀行的網銀系統，經過一個月針對該銀行的網銀系統評分，評分範圍為 0 到 100 分。研究者收集 260 位消費者的評分數據並進行迴歸分析，應變數 Y_i 是評分分數，並設定虛擬變數 x_{iL}、x_{iS}、x_{iT}、x_{iW}：

　　如果 Y_i 是 L 銀行網銀系統的分數，則 $x_{iL} = 1$，其餘虛擬變數為 0；

　　如果 Y_i 是 S 銀行網銀系統的分數，則 $x_{iS} = 1$，其餘虛擬變數為 0；

　　如果 Y_i 是 T 銀行網銀系統的分數，則 $x_{iT} = 1$，其餘虛擬變數為 0；

　　如果 Y_i 是 W 銀行網銀系統的分數，則 $x_{iW} = 1$，其餘虛擬變數為 0。

研究者使用 R 語言的 lm 指令得到兩個報表，節錄內容請見下頁表六與表七。表六對應之迴歸模型為 $Y_i = \beta_0 + \beta_1 x_{iL} + \beta_2 x_{iS} + \beta_3 x_{iT} + \varepsilon_i$，表七對應之迴歸模型為 $Y_i = \delta_1 x_{iL} + \delta_2 x_{iS} + \delta_3 x_{iT} + \delta_4 x_{iW} + \varepsilon_i$，兩個模型的 ε_i 為誤差項。以下敘述哪些或哪一項正確？

(A) L 網銀系統分數平均數為 70.4 分。

(B) S 網銀系統分數平均數為四家系統最高分。

(C) W 網銀系統分數平均數為四家系統最低分。

(D) 表七中(庚)為 81.2。

(E) 表七中(壬)與(癸)之和為 260。

5. 承第 4 題，同樣參考下頁表六與表七，以下敘述哪些或哪一項正確？

(A) 表六中(己)為 256。

(B) 在顯著水準為 1% 時，由表六可知 β_1、β_2、β_3 皆顯著異於 0。

(C) 表六的迴歸模型若將 x_{iT} 改為 x_{iW}，其餘變數不變，重新跑迴歸後可得到「在顯著水準為 5% 時，自變數係數皆顯著異於 0」的結論。

(D) 表六的(戊)與表七的(辛)二者數字相等。

(E) 表七 Multiple R-squared 很接近 1，因此表七使用的模型有 spurious regression 的問題。

表六：用於回答第 4、5 題

```
Call:
lm(formula = y ~ xL + xS + xT)


Coefficients:
            Estimate      Std. Error      t value      Pr(>|t|)
(Intercept)   70.4                                     (??) ***
xL            -6.7                                      (??) ***
xS            10.8                                      (??) ***
xT            8.2                                       (??) ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Residual standard error: **(戊)** on **(己)** degrees of freedom
Multiple R-squared: 0.4417, Adjusted R-squared: 0.4352
F-statistic: 67.51 on (??) and (??) DF, p-value: < 2.2e-16

表七：用於回答第 4、5 題

```
Call:
lm(formula = y ~ -1 + xL + xS + xT + xW)


Coefficients:
        Estimate      Std. Error      t value      Pr(>|t|)
xL         (??)                                    (??) ***
xS         (??)                                    (??) ***
xT        (庚)                                     (??) ***
xW         (??)                                    (??) ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Residual standard error: **(辛)** on (??) degrees of freedom
Multiple R-squared: 0.9882, Adjusted R-squared: (??)
F-statistic: 5380 on **(壬)** and **(癸)** DF, p-value: < 2.2e-16

第二部份：**單選題**（第 6-15 題，總共 40 分，每題 4 分，答錯倒扣 1.3 分，至多扣至本部份總分為 0 分；未作答者，該題以零分計。）

【題組，包括第 6-11 題】連續型二元隨機變數 (X, Y) 之機率密度函數如下：

$$f(x,y) = \begin{cases} ax^2 + by^2 & if \quad 0 < x < 1 \quad\quad 0 < y < 1 \\ 0 & o.w. \end{cases}$$

其中 a、b 皆為大於零之常數。

6. a、b 需滿足以下何者條件，方能使 $f(x, y)$ 為良好定義之機率密度函數？

(A) $a + b = 4$　　　　(B) $a + 2b = 5$　　　　(C) $2a + b = 5$

(D) $a + b = 3$　　　　(E) 以上皆非。

以下第 7-11 題進一步限定 a、b 皆為正整數且 $a > b$，

7. 期望值 $E(XY)$ 是以下何者？

(A) 3/8　　　　(B) 1/2　　　　(C) 5/8　　　　(D) 1/4　　　　(E) 以上皆非。

8. 期望值 $E(X)$ 是以下何者？

(A) 7/12　　　(B) 1/2　　　(C) 2/3　　　(D) 11/12　　　(E) 以上皆非。

9. 共變異數 $Cov(X, Y)$ 是以下何者？

(A) $-3/16$　　　(B) $-1/72$　　　(C) $-1/36$　　　(D) $-1/12$　　　(E) 以上皆非。

10. 機率 $P\left(0 < X < \frac{1}{2}, Y < \frac{1}{3}\right)$ 是以下何者？

(A) 11/324　　　(B) 1/16　　　(C) 17/648　　　(D) 13/162　　　(E) 以上皆非。

11. 條件機率 $P\left(0 < X < \frac{1}{2} \mid Y = \frac{1}{3}\right)$ 是以下何者？

(A) 19/81　　　(B) 5/22　　　(C) 11/76　　　(D) 5/28　　　(E) 以上皆非。

【題組,包括第 12-15 題】W、X、Y 為三個獨立同態的隨機變數,皆服從指數分配,期望值皆為 1,變異數也是皆為 1。

12. 令隨機變數 $S = \dfrac{X}{W}$,對應到 $s > 0$ 的範圍,S 的機率密度函數是以下何者?

(A) $6s(1+s)^{-4}$　　(B) $9se^{-3s}$　　(C) $(1+s)^{-2}$　(D) $2e^{-s}(1-e^{-s})$　　(E) 以上皆非。

13. 令隨機變數 $T = \dfrac{W}{W+X}$,期望值 $E(e^T)$ 是以下何者?

(A) $e-1$　　　(B) 4　　　(C) $2e$　　　(D) 不存在　　(E) 以上皆非。

14. 令隨機變數 $U = Min\{W, X, Y\}$,期望值 $E(U)$ 是以下何者?

(A) 5/16　　(B) 2/3　　(C) 3　　(D) 1/2　　(E) 以上皆非。

15. 令隨機變數 $V = Max\{W, X, Y\}$,期望值 $E(V)$ 是以下何者?

(A) 1/4　　(B) 11/6　　(C) 1/3　　(D) 3/2　　(E) 以上皆非。

【試題至此全部結束,以下無其他試題】

國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：微積分【財管系碩士班甲組】

－作答注意事項－

考試時間：100 分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。

- **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示**，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答(不得另攜帶紙張)。

- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。

- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。

- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶具有通訊、記憶或收發等功能或其他有礙試場安寧、考試公平之各類器材、物品（如鬧鈴、行動電話、電子字典等）入場。

- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。

- 試題採雙面列印，考生應注意試題頁數確實作答。

- 違規者依本校招生考試試場規則及違規處理辦法處理。

選擇題(單選) 20%、每題 4 分

1. 請問以下何者是錯誤的敘述？

    A. 積分符號 "$\int$" 是一個拉長的 S, 代表 Summation 也就是加總求和的意思

    B. 微分符號 "dx" 的作用是在 x 上分割求差, 所以 d 代表 difference

    C. ∞ 或無限大是一個無限大的數, 屬於實數集

    D. 所有正整數的數目與所有正偶數的數目一樣多

    E. 以上皆為錯誤

2. 請問以下何者是正確的敘述？

    A. 定積分 $\int_0^2 3\,dx$ 相當於在求一個三角形面積

    B. 目前微積分的符號多源自牛頓

    C. 著名的斐波納契數列 $\{0, 1, 1, 2, 3, 5, 8, \dots\}$ 為人造數列, 不存在於自然界中

    D. 函數 2^x 的微分是 $\ln 2 \cdot 2^x$

    E. 以上皆為正確

3. 請問以下何者是錯誤的敘述？

    A. 雙變數函數圖形中可能出現的鞍點為一理論值, 在自然界中沒有對應的例子存在

    B. 根號函數 $\sqrt{x}$ 與自然對數函數 $\ln x$ 為 convex 函數

    C. 當求極限 $\lim_{h \to 0}\left(\frac{e^h - 1}{h}\right)$ 得到 0/0 時, 我們沒有其他方法可以克服只能說無意義

    D. $\int \ln x\,dx = 1/x$

    E. 以上皆為錯誤

4. 以下何者所代表的意義與其他選項不同？

    A. 函數 $f(x)$ 為 concave

    B. $f(E[X]) \geq E[f(X)]$, 其中 $E[X]$ 為變數 X 的期待值

    C. $f(x) = \ln x, \; x > 0$

    D. $\ln(A.M.(X)) \geq A.M.(\ln(X))$, 其中 $A.M.(X)$ 為 $X = \{x_1, x_2, \dots, x_n\}$ 的數值平均
    (Arithmetic Mean)

    E. 以上皆相同

5. 以下何者是正確的敘述？

　A. 一個連續的函數必定是可微分

　B. 在黎曼和 (Riemann Sum) 的計算時,我們必須選取矩形底邊 Δx 的左端點,若選取中點或右端點則所求出的黎曼和會有不同的極限值

　C. 微分的乘積律與連鎖律均有相對應的積分技巧,例如從連鎖律可得出部分積分法 (Integration by Parts)

　D. 連續函數的中間值定理 (Mean Value Theorem) 只具有圖形上的幾何性質,與微分基本定理無關

　E. 以上皆為錯誤

計算題一：（20%）、每小題 4 分

求以下的極限

(1)
$$\lim_{x \to \infty} \left(\frac{\ln x}{x} \right)$$

(2)
$$\lim_{x \to \infty} (e^{-x} x^2)$$

(3)
$$\lim_{x \to 0+} x \ln x$$

(4)
$$\lim_{x \to 0+} x^x$$

(5)
$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x$$

計算題二：（20%）、每小題 10 分

(1) 求在函數 $f(x) = x^2$ 上之一點的座標, 其與點 $(16, 1/2)$ 的距離為最小;

(2) 此最小距離為多少?(不需實際計算,用算式表示即可)

計算題三：(20%)、每小題 5 分

求以下的積分：

(1)

$$\int \ln x \, \mathrm{d}x$$

(2)

$$\int x^2 \ln x \, \mathrm{d}x$$

(3)

$$\int x^2 \sin x \, \mathrm{d}x$$

(4)

$$\int_0^\infty \frac{2x}{(x^2+1)^2} \, \mathrm{d}x$$

申論題：(20%)、每小題 10 分

在電影那些年我們一起追的女孩中，有句台詞：

"我敢跟妳賭，十年後，我連 log 是什麼都不知道，照樣活得很好."

請說明：

(1) 自然對數函數的發明解決了人類關於計算的甚麼問題？

(2) 從財管系研究生的角度，舉出三個自然對數函數在商業上，或在經濟學，投資學或統計學等領域的應用.

國立中山大學111學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：經濟學【財管系碩士班乙組】

一作答注意事項一

考試時間：100分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。**

- **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答(不得另攜帶紙張)。**

- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。

- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。

- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶具有通訊、記憶或收發等功能或其他有礙試場安寧、考試公平之各類器材、物品（如鬧鈴、行動電話、電子字典等）入場。

- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。

- 試題採雙面列印，考生應注意試題頁數確實作答。

- 違規者依本校招生考試試場規則及違規處理辦法處理。
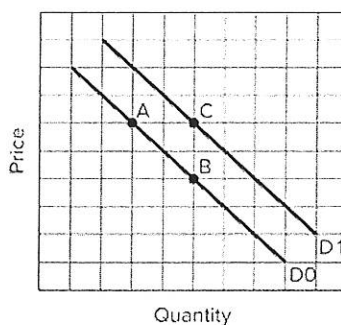
一、選擇題：單選，1-14 題為個體經濟，每題 2.5 分；15-34 為總體經濟，每題 2 分。

1. Suppose that a new drug (A) has been approved to treat a life-threatening disease. The demand for that drug is shown on the accompanying graph by demand curve A. Prior to approval of this drug, the only treatment for this condition was any one of several nonprescription, or over-the-counter, pain relievers. The demand for one brand of the several nonprescription pain relievers is also shown on the graph as demand curve B. The manufacturer of the new drug would _____ total revenue by increasing the price from $15 to $16.
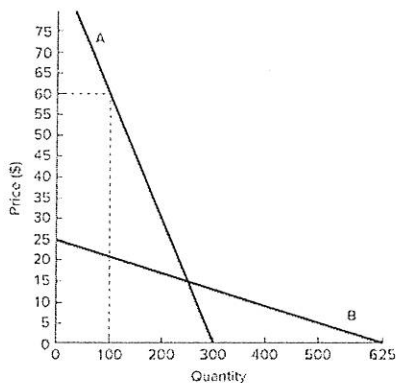
A) increase
B) decrease
C) experience no change in
D) experience an uncertain change in

2. Refer to the accompanying figure. Let ε denote the price elasticity of demand at point X. Which of the following describes the relationship between ε_A, ε_B, and ε_C?

A) $\varepsilon_A > \varepsilon_C > \varepsilon_B$
B) $\varepsilon_A > \varepsilon_B > \varepsilon_C$
C) $\varepsilon_C > \varepsilon_B > \varepsilon_A$
D) $\varepsilon_B > \varepsilon_C > \varepsilon_A$

3. Joaquin's marginal utility from an additional slice of pumpkin pie is 4 utils and his marginal utility from an additional slice of pecan pie is 6 utils. If a slice of pumpkin pie costs $2.50, and a slice of pecan pie costs $3, then Joaquin
A) should reallocate his spending towards pumpkin pie and away from pecan pie.
B) should reallocate his spending towards pecan pie and away from pumpkin pie.
C) is maximizing his utility.
D) should spend more on pumpkin pie and more on pecan pie.

4. When Lorenzo eats 1 slice of pizza for lunch, his total utility is 23, and when he eats 2 slices of

pizza for lunch, his total utility is 42. Assuming that Lorenzo's marginal utility from eating pizza is always positive, we can infer that his total utility from eating 3 slices of pizza at lunch is
A) greater than 42 and less than 84.
B) greater than 42 and less than 46.
C) greater than 42 and less than 61.
D) greater than 23 and less than 42.

5. Suppose your economics professor has an extra copy of a textbook that he or she would like to give to a student in the class. The scheme that is the most likely to result in an efficient outcome is
A) randomly selecting one student to receive the textbook.
B) auctioning off the textbook to the highest bidder.
C) letting students take turns using the textbook.
D) giving the textbook to the student who has the lowest midterm score.

6. Serena has been waiting for *Spider-Man: No Way Home* to come to her local movie theater. When it finally does come, tickets cost $6. Serena's reservation price is $7.5. But when Serena tries to buy a ticket, they are sold out. Suppose Sven was able to purchase a ticket at the box office for $6. Sven's reservation price for the ticket is $6.5. If Sven attends the movie and Serena does not, then this situation is
A) inefficient because Sven and Serena could have made a mutually beneficial trade.
B) efficient because Sven paid less for the ticket than his reservation price.
C) efficient because Sven arrived at the ticket counter before the show was sold out.
D) inefficient because Serena would have enjoyed the show too.

7. A good is characterized by network economies if it
A) can be used by more than one person at a time.
B) becomes cheaper to produce as more people buy it.
C) becomes more valuable as more people own it.
D) is widely advertised on television.

8. Hotelling's model has been used to describe differentiation in the political "market." Suppose that 100 voters are evenly distributed between the extreme left and the extreme right on the political spectrum, and that all voters vote, and they always vote for the candidate closest to them on this spectrum. The numbers on this spectrum represent the number of voters lying to the left of the number. So, at the midpoint, 50 voters lie to the left and 50 to the right.
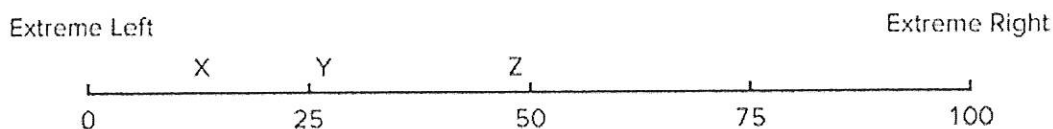
If Candidate X is running for office against Candidate Z, then
A) all voters to the left of Z will vote for X, and all voters to the right of Z will vote for Z.
B) all voters who would have voted for Y will vote for X.
C) Candidate Z will win.
D) Candidate X might win.

9. P-TV and QRS-TV are trying to decide whether to air a sitcom or a reality show in a given time slot. Viewers like both sitcoms and reality shows, but sitcoms are more expensive to produce than reality shows since real actors need to be hired. QRS-TV makes its decision first, and then P-TV

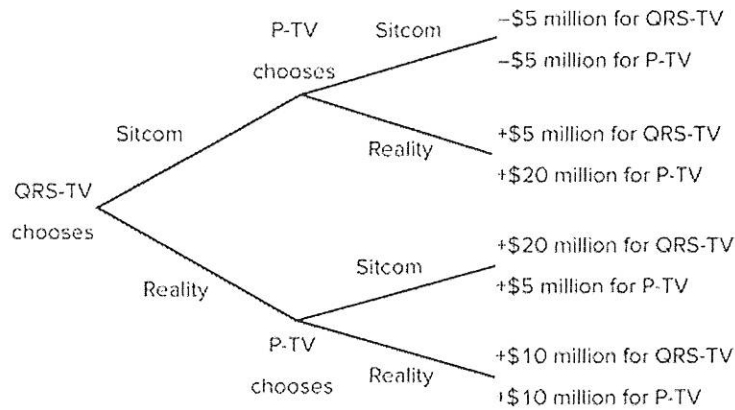observes that choice before making its decision. Both stations know all of the information in the accompanying decision tree.

Suppose QRS-TV enters into an agreement with P-TV that gives QRS-TV the exclusive right to air a reality show during this time slot. QRS-TV would have to pay P-TV _____ in order to persuade P-TV to enter into this agreement.
A) at least $10 million
B) nothing
C) at least $5 million
D) more than zero, but less than $5 million

10. The following data show the relationship between the number of drivers who leave for work at 8 a.m., their average commute time, and their marginal benefit of commuting.

Number of Drivers Who Leave at 8 a.m.	Average Commute Time	Marginal Benefit
100	30 minutes	$ 10
200	65 minutes	8
300	110 minutes	4
400	170 minutes	3
500	260 minutes	1

If there is no charge to use the highway, then one would expect that _____ than the socially optimal number of drivers will leave at 8 a.m. because _____.
A) more; each driver's use of the highway imposes an external cost on other drivers by increasing the commute time
B) more; the social marginal benefit of using the highway is greater than the private marginal benefit
C) less; each driver's use of the highway imposes an external cost on other drivers by increasing the commute time
D) less; the private marginal benefit of using the highway is greater than the social marginal benefit

11. Kate and Ali can live together in a two-bedroom apartment for $600 per month, or they can each rent a one-bedroom apartment for $400 per month. Apart from the rent, they are indifferent between living together and living apart, except for one problem: Kate hates Ali's taste in music. Kate would be willing to pay up to $100 a month to avoid hearing Ali's music. Ali would give up listening to her music for no less than $300 per month. Which, if any, of the following ways

of splitting the total monthly rent would induce them to live together?
A) Kate pays $150 per month and Ali pays $450 per month
B) Kate pays $250 per month and Ali pays $350 per month
C) Kate pays $375 per month and Ali pays $125 per month
D) There is no way to split the rent to induce them to live together.

12. There are two employers in Bucolic that hire people who do not have a high school degree: a grocery store and a hardware store. The grocery store pays $10 per hour and the hardware store pays $12 per hour. People who work at either store can work as many hours as they want at those wages. Assume that it takes two hours to interview for a job. Lee works at the grocery store but would like to work at the hardware store. If Lee interviews at the hardware store, there is a 10 percent probability of being hired. Assume that Lee is risk-neutral. How many hours must Lee anticipate working at the hardware store to justify interviewing for the job?
A) 1 hour
B) 10 hours
C) 100 hours
D) 60 hours

13. Espresso Yourself Coffee Shop hires workers in a competitive labor market to make coffee. The ingredients required to make each cup of coffee cost 50 cents. The coffee shop's hourly output of coffee varies with the number of workers hired, as shown in the accompanying table. Each cup of coffee sells for $2.00. The most the coffee shop would be willing pay the third worker is _____ per hour.

Number of workers	Coffee (cups/hour)
0	0
1	25
2	45
3	60
4	70
5	75
6	78

A) $60.00
B) $45.00
C) $22.50
D) $15.00

14. Suppose the market consists of three individuals: Citizen A, Citizen B, and Citizen C.
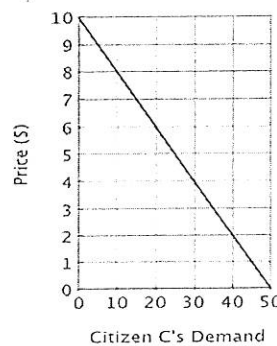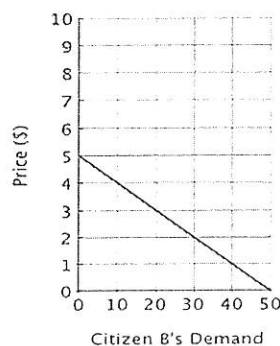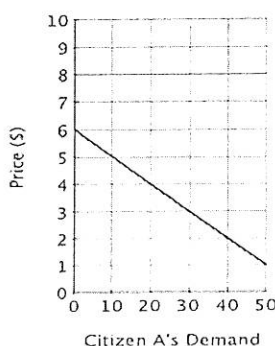
If the good shown on the graphs is a public good, and the marginal cost of providing each unit is

試題請隨卷繳回，請留意背面是否有題

constant and equal to $5, then what is the optimal quantity of the public good?
A) 50 units
B) 40 units
C) 30 units
D) 20 units

15. A rise in the real exchange rate is called
A)　a real depreciation.
B)　a real appreciation.
C)　a real bargain.
D)　a real devaluation.

16. The idea that new policies change the economic rules and affect economic behavior, so that no one can safely assume that historical relationships between variables will hold when policies change, is known as
A)　Okun's Law.
B)　Say's Law.
C)　the equation of exchange.
D)　the Lucas critique.

17. When the economy goes into a recession, there's an increase in
A)　frictional unemployment.
B)　structural unemployment.
C)　cyclical unemployment.
D)　voluntary unemployment.

18. Which of the following forms of unemployment probably imposes the greatest personal costs?
A)　Frictional unemployment
B)　Structural unemployment
C)　Cyclical unemployment
D)　Voluntary unemployment

19. One cost of a perfectly anticipated inflation is that it
A)　transfers wealth from lenders to borrowers.
B)　transfers wealth from borrowers to lenders.
C)　increases menu costs.
D)　damages the role of prices as signals in the economy.

20. When actual inflation is greater than expected inflation,
A)　the natural rate of unemployment rises, according to Phillips-curve analysis.
B)　cyclical unemployment rises, according to Phillips-curve analysis.
C)　there are transfers from borrowers to lenders.
D)　there are transfers from lenders to borrowers.

21. The graph plotting the tax rate on the horizontal axis and tax revenues on the vertical axis, which was used by supply-side economists to suggest that tax rates were too high, in known as the
A)　Beveridge curve.
B)　Phillips curve.
C)　Taylor rule.
D)　Laffer curve.

22. In which case would you be most likely to expect inflation to occur?
A) The government runs a sustained government deficit by lowering taxes.
B) The government runs a sustained government deficit by increasing purchases.
C) The government runs a sustained primary deficit by increasing purchases.
D) The government funds its sustained deficit by increasing the money supply.

23. At a given output level, a temporary reduction in government purchases will
A) increase desired saving, causing the IS curve to shift down and to the left.
B) increase desired saving, causing the IS curve to shift up and to the right.
C) decrease desired saving, causing the IS curve to shift down and to the left.
D) decrease desired saving, causing the IS curve to shift up and to the right.

24. A decrease in the effective tax rate on capital would cause the IS curve to
A) shift up and to the right.
B) shift down and to the left.
C) remain unchanged.
D) remain unchanged if taxes are fully deductible from income; otherwise, shift up and to the right.

25. Looking only at the asset market, an increase in output would cause
A) the LM curve to shift down and to the right.
B) the LM curve to shift up and to the left.
C) an increase in the real interest rate along the LM curve.
D) a decrease in the real interest rate along the LM curve.

26. A change that increases real money demand relative to the real money supply causes
A) the LM curve to shift down and to the right.
B) the LM curve to shift up and to the left.
C) the IS curve to shift down and to the left.
D) the IS curve to shift up and to the right.

27. Which of the following macroeconomic variables is procyclical and coincident with the business cycle?
A) Residential investment
B) Nominal interest rates
C) Industrial production
D) Unemployment

28. Which of the following macroeconomic variables is acyclical?
A) Real interest rates
B) Unemployment
C) Money supply
D) Consumption

29. The value of a producer's output minus the value of the inputs it purchases from other producers is called the producer's
A) surplus.
B) profit.
C) value added.
D) gross product.

30. If the steady-state capital-labor ratio is equal to the Golden Rule capital-labor ratio, then in the steady state,
A) output per worker equals investment per worker.
B) output per worker equals depreciation per worker.
C) investment per worker is as large as possible.
D) consumption per worker is as large as possible.

31. A Lorenz curve plots
A) unemployment and inflation.
B) job openings and the unemployment rate.
C) the distribution of labor supply.
D) the distribution of income.

32. The per-worker production function in the Solow model assumes
A) constant returns to scale and increasing marginal productivity of capital.
B) constant returns to scale and diminishing marginal productivity of capital.
C) increasing returns to scale and diminishing marginal productivity of capital.
D) decreasing returns to scale and diminishing marginal productivity of capital.

33. If an American construction company built a road in Kuwait, this activity would be
A) excluded from U.S. GNP.
B) fully included in U.S. GDP.
C) included in U.S. GNP only for that portion that was attributable to American capital and labor.
D) included in U.S. GDP but not in U.S. GNP.

34. Tobin's q is equal to
A) the ratio of capital's market value to its replacement cost.
B) the ratio of capital's replacement cost to its market value.
C) the expected after-tax real interest rate.
D) the stock market value of a firm.

二、計算填空題：總體經濟，共四題，每題 2.5 分。

1. An economy has government purchases of 1000. Desired national saving and desired investment are given by

$$S^d = 200 + 5000r + 0.10Y - 0.20G$$
$$I^d = 1000 - 4000r$$

When the full-employment level of output equals 5000, then the real interest rate that clears the goods market will be_____.

2. Suppose output is $35 billion, government purchases are $10 billion, desired consumption is $15 billion, and desired investment is $6 billion. Desired savings is equal to _____billion.

3. What is the unemployment rate if there are 170 million people employed, 25 million people unemployed, and 35 million not in the labor force?

4. If nominal money supply grows 3% and real money demand grows 8%, the inflation rate is _____.

三、計算填空題/簡答題：個體經濟，共五題。第五題 5 分，其餘每題 2.5 分。

1. Refer to the accompanying graph. If this firm is a price taker and the price of each unit of output is $9, then at its profit-maximizing level of output, this firm will earn _____.
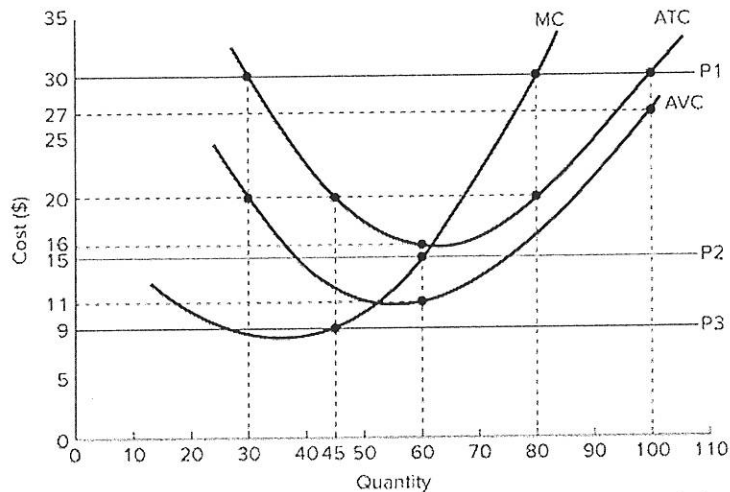
2. Suppose Campus Books, a profit-maximizing firm, is the only supplier of the textbook for a given class. The marginal cost of supplying each book is constant and equal to $10, and Campus Books has no fixed costs. The accompanying table shows the reservation prices of the eight students enrolled in the class.

Customer	Reservation Price ($/Book)
Q	60
R	54
S	48
T	42
U	36
V	30
W	24
X	18

If Campus Books is permitted to charge 2 prices, and the bookstore knows customers with a reservation price above $30 never bother with coupons, whereas those with a reservation price of $30 or less always use them, then in total the bookstore will sell _____ books.

3. Suppose Grandis and Immanis are the only two companies that sell the product whose market demand curve is shown in the accompanying figure. For both companies, both average total cost and marginal cost are constant and equal to $2 ($ATC = MC = \$2$). Suppose Grandis and Immanis agree to collude by both charging the price a monopolist would charge and each producing half of the monopolist's profit-maximizing level of output. If they both abide by this agreement, then each will earn a profit of _____ per day.
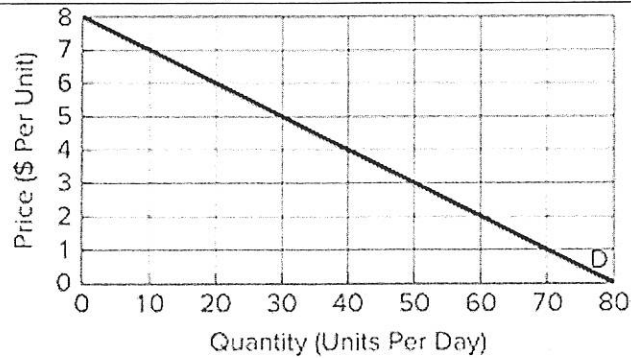
4. Two firms, Industrio and Capitalista, have access to five production processes, each of which has a different cost and gives off a different amount of pollution. The daily costs of the processes and the corresponding number of tons of smoke emitted are shown in the accompanying table. Both firms currently use process A, and each emits 4 tons of smoke per day. The government is considering two plans to reduce pollution: requiring both firms to reduce pollution by 25 percent or auctioning pollution permits. Each permit would entitle the owner to emit one ton of smoke per day. Without a permit, no smoke can be emitted.

Process (smoke/day)	A (4 tons/day)	B (3 tons/day)	C (2 tons/day)	D (1 tons/day)	E (0 tons/day)
Cost to Industrio ($/day)	$ 350	$ 400	$ 500	$ 700	$ 1,000
Cost to Capitalista ($/day)	225	250	290	400	600

Suppose the government decides to auction 6 permits. The government conducts the auction by starting at a price of $1 and asking how many permits each firm wants to buy at that price. If the total is more than 6, it raises the price by $1 and asks again until the total quantity demanded falls to 6. Under this system, each permit will sell for _____.

5. Behavioral Economics introduces more realistic assumptions about human motivation and cognition. Please list five documented "heuristic" or "bias" for decision-making in behavioral economics. (中英文皆可)

國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：財務管理【財管系碩士班丙組】

<div align="center">—作答注意事項—</div>

考試時間：100 分鐘

● **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。

● **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，**可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答(不得另攜帶紙張)。

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● **試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。**

● **試題採雙面列印，考生應注意試題頁數確實作答。**

● **違規者依本校招生考試試場規則及違規處理辦法處理。**

一、單選題 (每題 3 分，共 45 分)

1. One of the basic relationships in interest rate theory is that, other things held constant, for a given change in the required rate of return, the_____the time to maturity, the _____the change in price.
(A) shorter; smaller. (B) shorter; larger. (C) longer; smaller. (D)longer; greater.

2. Which of the following events would make it more likely that a company would choose to call its outstanding callable bonds?
(A) A reduction in market interest rates.
(B) The company's bonds are downgraded.
(C) An increase in the call premium.
(D) Statements (A) and (B) are correct.
(E) Statements (A) and (C) are correct.

3. Which one of the following statements is correct in relation to independent projects?
(a) The internal rate of return cannot be used to determine the acceptability of a project that has financing type cash flows.
(b) A project with investing type cash flows is acceptable if its internal rate of return exceeds the required return.
(c) A project with financing type cash flows is acceptable if its required return exceeds the internal rate of return.
(d) The net present value profile is upsloping for projects with both investing and financing type cash flows.
(e) Projects with financing type cash flows are acceptable only when the internal rate of return is negative.
(A) (a), (b), and (c) only　　(B) (b), and (c) only　　(C) (b), (c), and (d) only
(D) (b), (c), and (e) only　　(E) (b), (c), (d), and (e) only.

4. Which one of the following statements is correct?
(A) Unexpected returns can be either positive or negative in the short term but tend to be zero over the long-term.
(B) The expected return minus the unexpected return is equal to the total return.
(C) Over time, the average return is equal to the unexpected return.
(D) The expected return includes the surprise portion of news announcements.

5. Mr. Wang believes he excels at picking stock winners and thus trades frequently. Which characteristic does he most likely represent?
(A) Overconfidence
(B) Confirmation bias
(C) Frame dependence
(D) Representativeness heuristic
(E) Break-even effect

6. According to put-call parity, the present value of the exercise price is equal to the:
(A) stock price plus the put premium minus the call premium.
(B) stock price plus the call premium minus the put premium.
(C) call premium plus the put premium minus the stock price.
(D) put premium plus the call premium minus the stock price.

7. In the Black-Scholes option pricing model, the symbol "σ" is used to represent the standard deviation of the:
(A) option premium on a call with a specified exercise price.
(B) rate of return on a risk-free asset.
(C) volatility of the risk-free rate of return.
(D) rate of return on the underlying asset.
(E) option premium on a put with a specified exercise price.

8. Which one of the following statements related to cash dividends is correct?
(A) Regular cash dividends reduce paid-in capital.
(B) The dividend yield expresses the annual dividend as a percentage of net income.
(C) The last date on which you can purchase shares of stock and still receive the next dividend is the date that is two business day(s) prior to the date of record.
(D) All else equal, the market value of a stock will tend to decrease by roughly the after tax value of the dividend on the ex-dividend date.
(E) Declaration date is used to determine the names of shareholders who will receive a dividend payment.

9. The basic lesson of M&M theory is that the value of a company is dependent upon:
(A) the company's capital structure.
(B) size of the stockholders' claims.
(C) minimizing the marketed claims.
(D) the amount of the company's marketed claims.
(E) the total cash flows of that company.

10. The length of time between the purchase of inventory and the receipt of cash from the sale of that inventory is called the:
(A) inventory period.
(B) accounts receivable period.
(C) accounts payable period.
(D) operating cycle.
(E) cash cycle.

11. You should lease rather than buy when the:
(A) asset is fully depreciated.
(B) annual loan payments for a purchase are less than the annual lease payments.
(C) IRR from leasing is zero
(D) IRR from leasing exceeds the risk-free rate of return.
(E) NAL from leasing is positive.

12 Which one of the following statements is correct?
(A) Historical returns support the financial markets appear to be highly efficient because, on average, they outperform professional money managers.
(B) Portfolio managers with tenures greater than 10 years, consistently outperform the market.
(C) The performance of professional money managers improves the longer the investment period.
(D) Mutual funds that are actively managed outperform index funds over the long term.
(E) The number of mutual funds outperforming the Vanguard 500 Index Fund over a 10-year period is steadily rising.

13. Which one of the following statements is correct?
(A) The ABC approach to inventory management is based on the concept that inventory should arrive at the time it is needed in the manufacturing process.
(B) The ABC approach to inventory management is based on the concept that a small percentage of inventory items represents a large percentage of inventory cost.
(C) The Economic order quantity (EOQ) model is designed to determine how much total inventory a firm needs during any one year.
(D) Low inventory turnover rates is a characteristic of a just-in-time inventory system.
(E) At the optimal order quantity size, the carrying costs are equal to zero.

14. Which one of the following statements correctly applies to a merger?
(a) The acquired firm is completely absorbed and ceases to exist as a separate legal entity.
(b) The acquiring firm does not have to seek approval for the merger from its shareholders.
(c) The shareholders of the target firm must approve the merger.
(d) Seeking approval of the shareholders of both firms is a disadvantage of a merger
(e) For financial statement purposes, goodwill created by an acquisition must be reviewed each year and amortized to the extent that it has lost value:

(A) (a)(b)(c)　(B) (b)(d)(e)　(C) (a)(d)(e)　(D) (c)(d)(e)　(E) (a)(c)(d) (e)

15. Which one of the following statements is correct?
(a) Call options tend to be less sensitive to the passage of time than are put options
(b) An increase in time to expiration will decrease the value of an American call option
(c) Assume the risk-free rate increases. This change will increase the value of call options and decrease the value of put options on shares of stock.
(d) Increasing the time to maturity may not increase the value of a European put.
(e) The value of a put option increases when the standard deviation of the returns on the underlying stock increase.

(A) (a)(b)(c)　(B) (b)(d)(e)　(C) (a)(d)(e)　(D) (c)(d)(e)　(E) (a)(c)(d) (e)

二、計算題 (共 20 分)
1. SYS company just paid an annual dividend of $2 a share and is expected to increase that amount by 4 percent per year. How much should you expect to pay per share if the market rate of return for this type of security is 10 percent at the time of your purchase? (5 分)

2. Suppose we have the following projections for three stocks:

State of Economy	Probability of State of Economy	Rate of return if state occurs		
		Stock A	Stock B	Stock C
Good	0.2	10%	20%	-1%
Not change	0.5	5%	10%	2%
Bad	0.3	-2%	-8%	3%

If you have a portfolio SYS with amount invested on Stock A is NT$30,000, Stock B is NT$50,000 and Stock C is NT$20,000, please calculate:
(a) The Beta of Stock A is 0.8, Stock B is 1.5, and Stock C is 0.6. What is the beta of this portfolio? Does this portfolio have more or less systematic risk than an average asset? Why? (4 分)
(b) The risk-free rate is currently 2 percent and the expected return of an average risky asset is 4%, which stocks is overvalued? which stocks is undervalued? Why? (Please use Capital Asset Pricing Model (CAPM)) (6 分)

3.　SYS stock is selling for \$33 a share. A two-month, \$30 call on this stock is priced at \$3.5. Risk-free assets are currently returning 0.1 percent per month. What is the price of a two-month put on SYS stock with a strike price of \$30? (5 分)

三、問答題(共 35 分)

1.　請描述 Fama-French 五因子模型，請寫出方程式並清楚定義變數。(7 分)

2.　(a) 請定義 Sparpe ratio (請清楚定義變數) (3 分)
　　(b) 使用 Sparpe ratio 衡量投資績效時有何限制? (4 分)

3.　未來若新冠疫情無法結束且持續爆發是否會對金融市場造成危機?請提出你的看法並且嘗試解釋。(5 分)

4.　(a)請使用圖形及文字描述並解釋展望理論 (Prospect Theory)? (4 分)
　　(b)請進一步描述並解釋處分效果(Disposition Effect)?(3 分)

5.　(a)請使用圖形及文字描述並解釋資本市場線 (Capital Market Line; CML) (5 分)
　　(b)請進一步說明何謂兩基金分離定理 (Two fund separation theorem) (4 分)