

注意：本試卷有兩部分共四頁。請考生答題前務必閱讀每部分的注意事項說明。

第一部分：填充題(每格 5 分，共 50 分)

(1) 共有 10 個空格，請不要使用作答區第一頁「選擇題作答區」作答。於「選擇題作答區」下方自行製作如下 1-10 格答題區。

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

(2) 每格答對得 5 分，答錯或未作答 0 分。

(3) 填充題不需計算過程，僅依答案格內的答案對錯給分。

(4) 若無特別說明，請將答案約分至最簡分數。

1. A monopolist has an inverse demand $p(q) = 20 - 2q$ and its total cost function is $c(q) = 6 + 8q$.

(a) Derive the marginal revenue function of the monopolist: $MR(q) =$ _____ (1).

(b) The profit maximization output level is $q^* =$ _____ (2). The equilibrium market price is $p^* =$ _____ (3).

2. The demand function for chocolate is $D(p) = (p + a)^{-b}$, where p is the price for chocolate. $a > 0$

and $b > 1$ are constants. What is the price elasticity of demand for chocolate at price p ?
_____ (4)

3. Ken consumes two products, x_1 and x_2 . His utility function is $U(x_1, x_2) = x_1 x_2$. The price of good 1 is $p_1 = \$1$, and the price of good 2 is $p_2 = \$2$. Ken's income is \$20.

(a) Find Ken's optimal consumption bundle $(x_1^*, x_2^*) =$ _____ (5)

(b) Suppose that the price of x_1 increases from \$1 to \$2, while the price of x_2 and Ken's income do not change. The compensating variation of this price change is _____ (6), and the equivalent variation of this price change is _____ (7).

4. Consider a two-player game with the following payoff matrix:

		Player II	
		Enter	Not to Enter
Player I	Enter	(-10, -10)	(10, 0)
	Not to Enter	(0, 20)	(0, 0)

Each player can choose to "enter" the market or "not to enter" the market. The first number in each bracket is the payoff of player I, and the second number is the payoff of player II.

(a) List all pure strategy Nash equilibria: _____ (8)

(b) There is a mixed strategy Nash equilibrium of this game, that player I chooses "enter" with probability p and player II chooses "enter" with probability q . Find $(p, q) =$ _____ (9)

5. Consider a production function with three inputs: $Q(L, K, T) = L^{0.5} K^{0.5} + 2T$, where L is labor, K is capital, and T is land. This production function exhibits _____ (10) (constant, increasing, or decreasing) returns to scale.

第二部分：計算說明題(50 分)

- (1) 有四題計算說明題，請標示清楚，並將所有過程、步驟交代清楚。
(2) 若無特別說明，請將答案約分至最簡分數。

1. Consider an industry with two firms, facing the inverse market demand function:

$$p = 20 - q_1 - q_2$$

Where q_1 is the output of firm 1 and q_2 is the output of firm 2. The cost functions of the two firms are $c_1 = 10q_1$ and $c_2 = 12q_2$.

- (a) Consider Cournot competition that the two firms choose their output levels simultaneously. Find the Cournot-Nash equilibrium output levels (q_1^*, q_2^*) and the profits of the two firms. (10 points)
- (b) Consider Stackelberg competition that firm 1 chooses its output level first, and then firm 2 chooses its output level after observing firm 1's output. Find the Nash equilibrium output levels (q_1^*, q_2^*) and the profits of the two firms. (10 points)

2. James consumes coffee (x_1) and sugar (x_2). His utility function is $U(x_1, x_2) = \min(x_1, \frac{1}{2}x_2)$. His budget constraint is $p_1x_1 + p_2x_2 = m$; where p_1 is the price of coffee, p_2 is the price of sugar, and m is his income. Derive the demand functions of coffee and sugar, $x_1^*(p_1, p_2, m)$ and $x_2^*(p_1, p_2, m)$. (10 points)

3. Jason has a von Neumann-Morgenstern utility function of the form $U(W) = W^2$, where W is his wealth. Currently his only wealth comes from shares of a company. There is a 40% chance that the shares are worth \$30, and a 60% chance that they are worth \$10. Calculate the expected value of Jason's wealth and his expected utility. (10 points)
4. The production of automobiles uses three inputs: skilled labor (S), unskilled labor (L), and capital (K). The production function is $Q(S, L, K) = \min\{S + 2L, 3K\}$. The prices of these three inputs are $(P_S, P_L, P_K) = (1, 4, 2)$. What is the cost minimization combination of (S, L, K) to produce one unit of automobile? (10 points)

請回答下述問題（並詳述推理與計算過程）。

1. Let $\{x_n\}_{n=1}^{\infty}$ be a real sequence, and let $g: \mathbb{R} \rightarrow \mathbb{R}$ be a real-valued function. Given $x_0, y_0 \in \mathbb{R}$, please write down the $\epsilon - \delta$ definition for each following statement:

(1.1) The sequence $\{x_n\}_{n=1}^{\infty}$ converges to x_0 as n tends to ∞ . (5pts.)

(1.2) The sequence $\{x_n\}_{n=1}^{\infty}$ diverges as n tends to ∞ . (5pts.)

(1.3) $g(x)$ is continuous at $x = x_0$. (10pts.)

(1.4) $g(x)$ is differentiable at $x = x_0$. (10pts.)

2. Test the convergence of the following series.

(2.1) $\sum_{n=1}^{\infty} \frac{n^n}{n!}$. (5pts.)

(2.2) $\sum_{m=1}^{\infty} \frac{5}{3^m - 1}$. (5pts.)

(2.3) $\sum_{n=1}^{\infty} \frac{(-1)^n}{3n!}$. (5pts.)

3. Find $\frac{dy}{dx}$ for each following equation:

(3.1) $3x^3 + 2y^3 = 6xy$. (10pts.)

(3.2) $y = \int_0^{2x} \frac{e^{-xt}}{3} dt$. (5pts.)

4. Evaluate the following integrals:

(4.1) $\int_0^{\infty} x^2 e^{-x} dx$. (5pts.)

(4.2) $\int_{-\infty}^{\infty} \frac{1}{\sqrt{2}} e^{-\frac{1}{2}x^2} dx$. (5pts.)

5. Find the Taylor approximation of order two of each following function at the given point:

(5.1) $g(x) = xe^{-x^2}$ at $x = 1$. (10pts.)

(5.2) $G(x, y) = e^x \ln(1 + y)$ at $(x, y) = (0, 0)$. (10pts.)

6. Find the local and absolute extreme values of the following function on the given domain: (10pts.)

$$g(x) = 3x^3(x-2)^2, \quad -1 \leq x \leq 3.$$



國立中正大學 107 學年度碩士班招生考試試題
系所別：經濟學系國際經濟學-甲組

科目：總體經濟學

第 2 節

第 1 頁，共 5 頁

注意：本試卷有兩部份，Part I 有 20 題單選題，Part II 有三題填充題。請考生答題前，務

必閱讀每一部分的注意事項。

Part I：單選題（每題 3 分，共 60 分）

注意事項：依照題號順序，將答案寫在答案卷第一頁選擇題作答區對應題號空格內（第 1～20 格）。每格
答對得 3 分，答錯或未作答 0 分。

- 下列何者並非典型的反景氣政策（一般國家在經濟不景氣時會採用之總體政策）？
(A) 降低利率。
(B) 貶值。
(C) 擲節政府支出。
(D) 以上均是緩和或不景氣的政府政策。
- 以下對於關於物價指數的敘述，何者有誤？
(A) CPI 通常高估物價上漲時消費者生活成本的增加。
(B) 今年住宿舍一學期需 28,000 元，而參考之基期年住宿舍一學期要 30,000 元，已知今年 CPI 是 95，這代表住宿費比以前變便宜了。
(C) 我國進口之泰國米價格上漲，會直接造成我們 CPI 上升，但不影響 GDP 平減指數。
(D) 以上皆為正確敘述。
- 一個國家的經濟成長率一直維持每年 2% 時，它大概多久能將其產出變成二倍？
(A) 25 年以內。
(B) 25~49 年。
(C) 50~99 年。
(D) 100 年。
- 下列國際貨幣基金會所公布的統計值中，由哪一種統計最能反映出 2015 年台灣人民生活水準在國際上的高低？
(A) 每人年均實質 GDP 為 665,814 新台幣。
(B) 每人年均名目 GDP 為 713,390 新台幣。
(C) 每人年均 GDP 為 46,915 購買力平價國際元。
(D) 每人年均 GDP 為 22,358 美金。
- 關於「收斂假說 (convergence hypothesis)」的敘述，下列何者不正確？
(A) 一個國家在發展之初其經濟成長率會較高，但隨著資本累積其成長率會逐漸下降。
(B) 假若各國的人口成長率、生產技術和期初資本量相同，就算儲蓄率不同，最終收斂的每人所得仍相同。
(C) 該假說在以西方國家的資料進行實證分析時，多數可得到支持。
(D) 關於該假說最為人詬病的地方在於其來源理論之缺乏個體基礎 (micro foundation)。

6. 下列關於經濟成長之敘述，何者較無理論或實證之支持？
- (A) 天然資源的貧脊或豐富與一國經濟成長表現較無關係。
 - (B) 人口成長較快對於經濟成長有使一國資本稀釋之降低成長效果與加速技術進步之提升成長效果。
 - (C) 開放程度越高的國家其長期之經濟成長也越高。
 - (D) 以上皆有理論或實證之支持。
7. 下何者最可能造成一國貨幣實質貶值？
- (A) 國際熱錢流入該國。
 - (B) 該國物價上漲。
 - (C) 該國消費者更喜歡購買進口品。
 - (D) 以上皆非。
8. 某一開放經濟在 2017 年之 GDP 為 120，家計單位消費支出 80，廠商國內實體投資 20，政府消費性支出 15，政府總稅收 10，國外資產利息收入淨額 -5，由以上資訊可知該體系在 2017 年：
- (A) 貿易收支為盈餘。
 - (B) 經常帳為盈餘。
 - (C) 資本金融帳為盈餘。
 - (D) 國際收支為盈餘。
9. 承第 8 小題，則該國
- (A) 國內產出大於國民支出。
 - (B) 國內產出等於國民支出。
 - (C) 國內產出小於國民支出。
 - (D) 以上皆有可能。
10. 承第 8 小題，則該國
- (A) 國民儲蓄大於國內資本累積。
 - (B) 國民儲蓄等於國內資本累積。
 - (C) 國民儲蓄小於國內資本累積。
 - (D) 以上皆有可能。
11. 在過去幾年中，假設貨幣的流通速度固定，實質 GDP 成長 2.2%，通貨膨脹率 2.8%，名目利率是 3.5%，由貨幣數量學說可知，過去幾年的貨幣成長率是：
- (A) 1.5%。
 - (B) 2.9%。
 - (C) 5.0%。
 - (D) 8.5%。

12. 關於勞動供給曲線的敘述，何者正確？(1)等於勞動邊際產量曲線；(2)正斜率是因為實質工資的替代效果大於所得效果；(3)勞動所得稅率提高，勞動供給增加；(4)當消費者對休閒 (L) 與商品 (C) 的偏好可以此效用函數 $U(L, C) = L^{1/2}C^{1/2}$ 表示時，勞動供給曲線為正斜率；(5)當消費者對休閒與商品的偏好改為完全互補 $U(L, C) = C/L = 2$ 時，勞動供給曲線為負斜率。
- (A) (1) (2) (4)。
(B) (2) (5)。
(C) (2) (3) (4)。
(D) (2) (4) (5)。
13. 關於古典模型的敘述，何者正確？(1) 古典二分法是說名目部門的變動不影響實質變數；(2) 古典二分法是說名目部門與實質部門互相獨立；(3) 古典模型假設充分就業的產出；(4) 貨幣中立性成立；(5) 公債融通的政府支出增加，有完全排擠效果。
- (A) (1) (4) (5)。
(B) (2) (4) (5)。
(C) (1) (3) (4) (5)。
(D) (2) (3) (4) (5)。
14. 某經濟的 Phillips 曲線為 $\pi_t = \pi_t^e - 2(u_t - 0.04)$ 。若第 1 期預期通貨膨脹率為 1%，政府設定失業率目標為 $u_1 = 3\%$ ，第 1 期實際通貨膨脹率等於_____才能達此目標。又假設人民有適應性預期且調整係數為 0.5，若第 2 期政府仍欲維持失業率目標為 $u_2 = 3\%$ ，則第 2 期的實際通貨膨脹率應為_____才能達此目標。
- (A) 2% ; 2%
(B) 2% ; 3%
(C) 3% ; 3%
(D) 3% ; 4%
15. 根據 New Classical 理論，央行突如其來的透過公開市場操作賣債券，對勞動市場的影響是？
- (A) 就業量、名目工資以及實質工資皆下降。
(B) 名目工資下降，就業量和實質工資不變。
(C) 就業量和名目工資下降，實質工資上升。
(D) 就業量和名目工資上升，實質工資下降。
16. 假設含有預期的總供給曲線 (EAS 曲線) 為 $Y = 1000 - 50(2P^e/P)^2$ ，總需求曲線 (AD 曲線) 為 $Y = 600 + 2M/P$ 。若預期的名目貨幣供給 M 為 500，則理性預期物價等於：
- (A) $P^e = 2.5$ 。
(B) $P^e = 3$ 。
(C) $P^e = 4$ 。
(D) $P^e = 5$ 。

17. 兩期消費模型中，其他因素不變，只有第二期所得增加，將導致
- (A) 第一、二期消費皆增加，但儲蓄減少。
 - (B) 第一、二期消費以及儲蓄皆增加。
 - (C) 第一期消費減少，第二期消費增加。
 - (D) 只有第二期消費增加。
18. 兩期投資模型，令 K_1 和 K_2 分別代表第一期和第二期資本存量， MP_{K_1} 和 MP_{K_2} 分別為其邊際產量。資本折舊率為 δ ，實質淨利率為 r 。最適投資條件應滿足：
- (A) $MP_{K_1} - \delta = r$ 。
 - (B) $MP_{K_2} - \delta = r$ 。
 - (C) $MP_{K_1} = r$ 。
 - (D) $MP_{K_2} = r$ 。
19. 根據跨期模型，若發生下期正向生產衝擊，就以下相關的傳遞過程，請選出敘述完全正確的選項：
- (A) 下期資本的邊際產量增加 → 投資需求曲線左移 → 總合需求曲線左移。
 - (B) 總合供給曲線與總合需求曲線均右移 → 均衡產出與均衡實質利率均增加。
 - (C) 均衡實質利率增加 → 勞動供給增加 → 均衡實質工資下降。
 - (D) 均衡實質利率增加 → 勞動供給減少 → 均衡就業量減少。
20. 某人應用 Tobin 資產選擇理論決定其財富如何分配於貨幣與債券兩種資產。其效用取決於財富的報酬和風險： $U(R, \sigma) = 10R - 2\sigma$ ， R 為財富的預期報酬， σ 為財富的風險。此人為風險_____者；當持有債券的資本利得之變異數增加時，持有貨幣的比例會_____。
- (A) 中立；不變
 - (B) 趨避；增加
 - (C) 愛好；減少
 - (D) 趨避；減少

Part II：填充題 (共 40 分)

注意事項：(1) 依照格號順序，將答案寫在答案卷第一頁選擇題作答區對應格號空格內 (第 21 ~ 30 格)。
每格答對得 4 分，答錯或未作答 0 分。

(2) 答題不要求任何計算過程，只依答案格內的答案對錯給分。

(3) 計算答案若除不盡時，請將答案算到小數點第一位，以下四捨五入。

一、考慮國際貿易，假設一簡單凱因斯模型當中：

$$C = 100 + 0.8Y, I = 50, G = 50, X = 10, M = 0.05Y,$$

式中 C 為家計部門消費支出、 Y 為所得、 I 為廠商投資支出、 G 為政府消費支出、 X 為出口、 M 為進口。請問：

1. 該模型之均衡國民所得為 (21)。
2. 均衡時的誘發性消費 (induced consumption) 為 (22)。
3. 自發性支出 (autonomous expenditure) 乘數為 (23)。
4. 其他條件不變，若出口由 10 單位變為 15 單位，則均衡所得將變動多少？ (24)。(須註明「增 (+)」或「減 (-)」)
5. 其他條件不變，假設政府突然宣布要多徵收家計部門 50 單位的定額稅，請問新的均衡產出將變動多少？ (25)。(須註明「增 (+)」或「減 (-)」)

二、新古典生產函數為 $Y = 10K^{1/2}(AN)^{1/2}$ ，資本(K)折舊率為 1%、勞動人口(N)成長率為 3%、技術(A)進步率為 1%、儲蓄率為 20%。試回答下列問題：

1. 計算 Steady state 下的每有效勞動力資本量 (k^*) (steady state capital per effective labor) 為 (26)。
2. 計算 Golden rule 下的每有效勞動力資本量 (k_g) 為 (27)。Golden rule 下的儲蓄率等於 (28)。

三、Keynesian AS-AD 模型表示如下：

IS 曲線： $Y = 100 - 60r$ ， Y 為實質產出、 r 為實質利率；

LM 曲線： $\frac{M}{P} = Y - 60r$ ，其中 M 為 240。

生產函數： $Y = 40\sqrt{N}$ ，

名目工資僵固在 W 為 40，且資方有權決定勞動雇用量。

1. 寫出 Keynesian AS (總供給曲線) 方程式 (29)。
2. AS-AD 均衡決定的均衡物價和產出 (30) (寫出 $P = ?$ 和 $Y = ?$)。



考生作答須知：本考科共 32 題選擇題，第 1~30 題，每題 3 分；第 31~32 題，每題 5 分；滿分 100 分。請將唯一最正確的答案填入選擇題作答區。

1. Among economists listed below, who have (has) just won the Nobel Laureates in Economics in 2017?
A. Leonid Hurwicz, Eric S. Maskin, and Roger B. Myerson
B. Richard Thaler
C. John C. Harsanyi, John F. Nash Jr., and Reinhard Selten
D. Edmund S. Phelps
2. If utility is given by $U(x, y) = \text{Min}\{x, 3y\}$, then the bundle (3,2) provides the same utility as the bundle
A. (1, 3) B. (4, 1) C. (4, 4) D. (4, 2)
3. If an individual's utility function is given by $U(x, y) = \sqrt{xy}$ and the income and prices of goods are respectively, $I = 100, p_x = 4, p_y = 1$, his or her preferred consumption bundle (x, y) will be:
A. (12.5, 50) B. (20, 20) C. (15, 40) D. (10, 60)
4. As long as marginal cost is below average cost, the average cost will be
A. rising. B. falling. C. constant. D. changing ambiguously.
5. Let a price-taking firm's production function be given by $q = \sqrt{l}$, in which l denotes the labor used in the production. Variables p and w denotes the price of the good and the wage rate respectively. The supply function of the firm is given by
A. $q = p/2w$. B. $q = 2pw$. C. $q = 2p/w$. D. $q = 2w/p$.

6. Two identical firms face market demand $P(Q) = 20 - Q$ and have total costs

$$C(q_i) = 2q_i \quad (i = 1, 2). \text{ The Cournot equilibrium is given by } q_1^* = q_2^* =$$

- A. 6. B. 5. C. 4. D. 7.

7. A monopsonist that faces a labor supply curve of the form $L^s = 4w$ and has a constant marginal revenue product of 100 per unit of labor, will opt for the following, (w, L) combination

- A. $(w = 40, L = 160)$. B. $(w = 50, L = 200)$. C. $(w = 60, L = 240)$.
D. $(w = 70, L = 280)$.

8. The "free rider problem" of public goods refers to

- A. individuals' refusal to pay taxes.
B. individuals' overuse of collective goods.
C. individuals' attempts to hide their preferences for collective goods and to avoid paying for them.
D. the infinite elasticity of individuals' demands for public goods.

Use the following message to answer questions 9 and 10.

There are two used car dealerships. The first, Bob's Cars, always sells high-quality cars. It costs Bob's \$10,000 to buy and service each car that it sells. The second dealership, Peter's Motors, always sells lower-quality cars. It costs Peter's only \$7,000 for each car that it sells. If consumers knew the quality of the used cars, they would pay \$12,000 for Bob's cars and only \$9000 for Peter's cars.

If consumers do not know the quality of each dealership's cars, they believe there is a 50-50 chance of ending up with a high-quality car, and are thus willing to pay \$10,500 for a car. Let the profits of Bob and Peter be denoted respectively by (π_B, π_P) .

Suppose that Bob will offer a bumper-to-bumper warranty on all cars he sells. A warranty lasting Y years will cost Bob \$500Y, and if Peter tries to offer the same warranty, it will cost Peter \$1000Y.

9. Suppose that Bob offers a one-year warranty.

- A. If Peter does not offer any warranty, then $(\pi_B = 2,000, \pi_P = 2,000)$.
B. If Peter does not offer any warranty, then $(\pi_B = 1,500, \pi_P = 2,000)$.
C. If Peter also offers a one-year warranty, then $(\pi_B = 2,000, \pi_P = 2,000)$.
D. If Peter also offers a one-year warranty, then $(\pi_B = 2,000, \pi_P = 1,000)$.

10. If you were advising Bob, how long a warranty would you urge him to offer?
A. 2-year. B. 2.5-year. C. 1.5-year. D. 3-year.

In Figure 1 below, MEC curve is the marginal external cost, which denotes the marginal pollution cost made by the production of the firm. MC curve is the marginal cost of the firm and MSC curve is the marginal social cost. Furthermore, MSB is the marginal social benefit curve (demand curve) in the market. In Figure 1, answer the following questions 11 and 12.

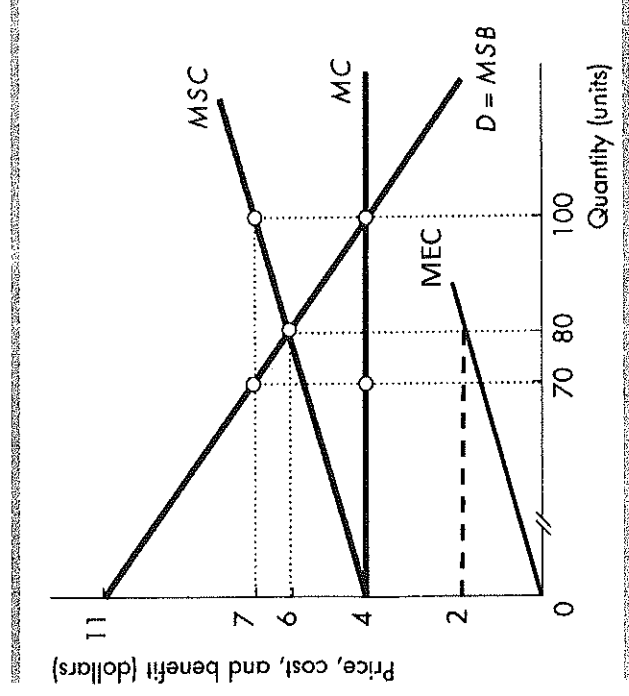


Figure 1

11. Choose the correct statement.
- A. If there are no property rights and no regulation on the pollution, the market equilibrium output will be 80.
 - B. If the Coase Theorem applies, the equilibrium output will be 80.
 - C. The efficient output will be 100.
 - D. If the Coase Theorem applies and the property right is assigned to the firm, the equilibrium output will be 100.
12. If the Coase Theorem applies and the property right is assigned to the firm,
- A. the firm produces at 80 and receives \$6 for each unit of output.
 - B. the firm produces at 80 and pays \$2 for each unit of output to the consumers.
 - C. the firm produces at 100 and pays \$3 for each unit of output to the consumers.
 - D. the firm produces at 100 and receives \$7 for each unit of output.

Use the following message to answer questions 13 and 14.

In a perfectly competitive market, assume that the market demand is denoted by $P(Q) = 20 - Q$ and the marginal private cost is denoted by $C(Q) = 3Q$. Let the marginal external cost be $MEC = Q$.

13. Under the regime without any regulation, the market equilibrium will occur at
A. $(P = 16, Q = 4)$. B. $(P = 15, Q = 5)$. C. $(P = 8, Q = 12)$.
D. $(P = 6, Q = 14)$.

14. Suppose that the government imposes a pollution tax per unit of output, denoted by t . Then the Pigovian tax rate t should be
A. $(t = 7)$. B. $(t = 5)$. C. $(t = 6)$. D. $(t = 4)$.

15. Which of the following expenditures associated with the production of a new high-performance SUV will be directly included in GDP?

- A. the sale of bonds to finance the construction of the assembly plant.
- B. the purchase of used welding robots to assemble vehicles.
- C. the purchase of new machine tools to manufacture the engines.
- D. the purchase of new tires to be installed on the new vehicles.

16. The labor force includes

- A. only the number of people employed.
- B. discouraged workers.
- C. only the number of people unemployed.
- D. both employed and unemployed workers.

17. Suppose the working age population in country A is 100 million people. If 25 million of these people are NOT in the labor force, the _____ a _____ equals _____ b _____.

- A. a = unemployment rate; b = $25/100 \times 100$
- B. a = unemployment rate; b = $25/75 \times 100$
- C. a = labor force; b = 75 million
- D. a = labor force; b = $25/100 \times 100$

18. In January 2017, Bob's company-owned machines valued at \$100 million.

During the year, the market value of the equipment fell by 30 percent. During 2017, Bob spent \$1 million on new machines. During 2017, Bob's gross investment totaled

- A. \$100 million. B. \$30 million. C. \$31 million. D. \$1 million.

19. If a bank's net worth is negative, then the bank definitely will be
A. liquid. B. illiquid. C. insolvent. D. solvent.
20. When the inflation rate is zero, the
A. real interest rate equals the nominal interest rate.
B. real interest rate is less than the nominal interest rate.
C. nominal interest rate is zero.
D. real interest rate is greater than the nominal interest rate.
21. Which of the following does NOT describe a function of money?
A. hedge against inflation B. a unit of account C. a medium of exchange
D. a store of value
22. The quantity of real GDP supplied depends on the
A. level of aggregate demand.
B. quantity of labor, the quantity of capital, and the state of technology.
C. quantity of capital, bonds, and stocks.
D. price level, the unemployment rate, and the government expenditures on goods and services.
23. In the macroeconomic short run,
A. actual real GDP may be less than or more than potential GDP.
B. the unemployment rate is zero.
C. by definition, the economy is always moving away from full employment.
D. actual real GDP always equals potential GDP.
24. In the macroeconomic long run,
A. there is full employment and real GDP is equal to potential GDP.
B. there is full employment with no unemployment.
C. output always is above potential GDP.
D. GDP always is below potential GDP.
25. When the price level rises, the long-run aggregate supply curve _____.
A. shifts rightward. B. does not shift. C. shifts upward. D. shifts leftward.
26. The short-run aggregate supply curve and the long-run aggregate supply curve
A. are perpendicular to one another at potential GDP.
B. are parallel at potential GDP.

- C. intersect at potential GDP.
D. intersect at GDP less than potential GDP.
27. Suppose the price level, the money wage, and the price of all other resources rise by 10 percent. This set of changes leads to
A. an upward movement along the short-run aggregate supply curve.
B. a downward movement along the long-run aggregate supply curve.
C. an upward movement along the long-run aggregate supply curve.
D. a leftward shift in the long-run aggregate supply curve.
28. If there are no taxes or imports and marginal propensity to consume $MPC = 0.75$, the multiplier equals
A. 0.25. B. 1.33. C. 4. D. 1.25.
29. Demand-pull inflation starts with
A. an increase in aggregate demand.
B. a decrease in aggregate demand.
C. an increase in short-run aggregate supply.
D. a decrease in short-run aggregate supply.
30. Cost-push inflation can be started by
A. a decrease in the money wage rate.
B. an increase in the money prices of raw materials.
C. an increase in the quantity of money.
D. a decrease in government expenditure on goods and services.
31. The current growth rate of real GDP per person in country A is 7 percent a year. How long will it take to double real GDP per person?
A. 5 years B. 7 years C. 28 years D. 10 years
32. Neoclassical growth theory predicts that
A. advances in technology increase the productivity of capital, which leads to an increase in investment and rising real GDP per person.
B. advances in technology are a result of discoveries motivated by the pursuit of profits.
C. growth in real GDP can increase without any increase in investment.
D. growth in real GDP can continue indefinitely.

Part I：填空题（每格5分，共50分）

注意事項：

- (1) 此部分不須計算過程。
- (2) 請不要使用「選擇題作答區」作答。
- (3) 請自行於作答區第一頁「選擇題作答區」的下面製作如下的填空题作答區：

(a)	(b)	(c)	(d)	(e)
(f)	(g)	(h)	(i)	(j)

1. Let X and Y be two random variables. Suppose that $E(X|Y) = 1.5 + 0.5Y$, $\text{Var}(X|Y) = 0.75Y^2$, $E(Y) = 0$, and $E(Y^2) = 1$. Then we can obtain that $E(X) =$ (a) _____, $\text{Var}(X) =$ (b) _____, and $\text{Cov}(X, Y) =$ (c) _____. Now suppose that $E(Y|X) = \alpha + \beta X$, where α and β are two non-stochastic parameters. Then $\alpha =$ (d) _____ and $\beta =$ (e) _____.
2. Let $X_i \sim \text{i.i.d. } N(0,1)$, $i = 1, \dots, n$. Also let $f(x_1, \dots, x_n)$ be the corresponding joint probability density function. Then $f(x_1, \dots, x_n) =$ (f) _____. Consider the sample mean: $\bar{X}_n = n^{-1} \sum_{i=1}^n X_i$. We can find that $E(\bar{X}_n) =$ (g) _____ and $E[\sum_{i=1}^n (X_i - \bar{X}_n)^2] =$ (h) _____. Now suppose that $M(t)$ is the moment generating function of \bar{X}_n . Then $M(t) =$ (i) _____. Let $Y_1 < Y_2 < \dots < Y_n$ be the order statistics of X_1, \dots, X_n . Suppose that $g(y_n)$ is the probability density function of Y_n . Then $g(y_n) =$ (j) _____.

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.

1. Consider the simple linear regression model $Y_i = \beta_0 + \beta_1 X_i + u_i$, $i = 1, \dots, n$.

Assume all the general assumptions hold for the linear regression. Let

$$Y = \begin{pmatrix} Y_1 \\ \vdots \\ Y_n \end{pmatrix}, X = \begin{pmatrix} 1 & X_1 \\ \vdots & \vdots \\ 1 & X_n \end{pmatrix}, u = \begin{pmatrix} u_1 \\ \vdots \\ u_n \end{pmatrix} \text{ and } \beta = \begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix},$$

then the matrix form of the model is $Y = X\beta + u$, where $\text{Var}(u) = \sigma^2 I_n$. The ordinary least squares (OLS) estimator of β is

$$\hat{\beta} = \begin{pmatrix} \hat{\beta}_0 \\ \hat{\beta}_1 \end{pmatrix} = (X^T X)^{-1} X^T Y.$$

- (a) Find $(X^T X)^{-1}$ and $X^T Y$. (10%)
(b) Use the result from (a) to show that $\hat{\beta}_0 = \bar{Y} - \hat{\beta}_1 \bar{X}$. (10%)
(c) Given the matrices $\hat{\beta}$, Y and $X^T Y$, how can we use them to compute the coefficient of determination R^2 ? (10%)
(d) Show that $\text{Var}(\hat{\beta}) = \sigma^2 (X^T X)^{-1}$. (10%)
(e) If we want to test the hypothesis $H_0: \beta_0 + \beta_1 = 1$ against the alternative hypothesis $H_1: \beta_0 + \beta_1 \neq 1$. How can we use the above result to conduct the test? Please be specific about the test statistics. (10%)