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：填空題(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) 填空題不需計算過程，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

Player I		Enter	Not to Enter
	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)**