

答案本上已註明題號，請將各題答案填入正確位置。(1) 至 (12) 題每題六分，(13) 至 (16) 題每題七分，滿分一百分。

答案若寫在未註明題號之空白頁，視同未作答。未註明題號之空白頁可供計算用。

你可以中文或英文作答，也可使用非記憶式計算機 (限用 $+$, $-$, $\times$, $\div$, $\sqrt{\quad}$, 指數, 對數, 冪數及三角函數等功能)。

(1)-(2) The demand function for oil in a country is $Q_d = a - bP$, where Q_d is the quantity demanded, P is the price, $a > 0$ and $b > 0$. The supply function for oil is $Q_s = -c + dP$, where Q_s is the quantity supplied, $c \geq 0$ and $d > 0$. Suppose the equilibrium price is 10 and the equilibrium quantity is 20. At the equilibrium, the absolute value of the elasticity of demand is $|\epsilon| = 0.5$ and the elasticity of supply is $\eta = 4$.

(1) What is the value of b ?

(2) Suppose the government imposes a tax of \$0.45 per unit on suppliers. What is the new equilibrium price that consumers pay?

(3)-(4) Suppose that Maria consumes two goods each year: music CDs and movie DVDs. Let x_c be the amount of CDs purchased, and x_d the amount of DVDs purchased. Her utility function is $u(x_c, x_d) = x_c + 2\sqrt{x_d}$. The prices are p_c , p_d , and the income is Y .

(3) Suppose $p_c = p_d = 300$ and $Y = 12,000$. How many CDs does Maria purchase?

(4) Suppose $p_c = p_d = 300$ and $Y = 12,000$, but Maria's dad does not allow Maria to buy more than 31 CDs in a year. That is, Maria now has a new constraint that $x_c \leq 31$ (a quota). Compared with the case without this constraint, the quota is equivalent to a reduction of R in her income. Calculate R . [You are looking for the income level $Y - R$. When Maria has income level $Y - R$ and is free to consume anyway she wants, she gets the same utility as she gets from having income Y and facing the quota.]

(5)-(6) A firm has the production function $q = \sqrt{L} + \sqrt{K}$. The input prices are w for L and r for K . Suppose $w = r = 1$.

(5) In the short run, $K = 1$. Derive the short-run cost function.

(6) Derive the long-run cost function.

(7)–(8) To produce wine, a firm must get a license from the government. If two or more firms get the license, they will compete perfectly. If there is only firm purchasing the license, it becomes a monopoly. It costs a firm F to get the license. There are 20 firms that can produce wine and have identical technology. Each firm's cost function after paying for the license is $c(q) = 2q^2 + F$, where q is the output of the firm. The market demand function for wine is $Q_d = 16 - P$, where P is the price of wine and Q_d is the total quantity demanded. If $n \leq 20$ firms get the license, the total supply of wine is $Q_s = nq$.

(7) Suppose the government wants to maximize its total revenue of the licenses, nF , in the long-run equilibrium. How much should F be?

(8) Suppose the government wants to give only one firm the license. The firm who gets the license will be a monopoly, and can charge whatever price the firm likes. What is the maximal F the government can charge?

(9)–(10) A person has a wealth of \$100. With probability 0.1, he might have a car accident in a year; with probability 0.9, no accident occurs in a year. If a car accident occurs, his wealth decrease and becomes \$81. If there is no accident, his wealth remains \$100. The person's utility from his wealth is $U(W) = \sqrt{W}$.

(9) Suppose there is an insurance company offering him a contract: The person pays the insurance company $\$X$ first. If a car accident occurs, the person receives \$19 from the insurance company, but if there is no accident, the insurance company does not pay anything to the person. What is the maximal value of X that the person is willing to pay?

(10) Suppose the insurance company changes the policy by adding a condition: When there is an accident, the insurance company pays \$19 to the person if the accident is not due to the person's fault. If it is the person's fault, the insurance company pays nothing. If there is no accident, the insurance company pays nothing either. Suppose that given an accident occurs, the probability that it is the person's fault is 0.1. So the total probability that there is no accident is still 0.9. The total probability that there is an accident that is not caused by the person is 0.1×0.9 , and the total probability that there is an accident that caused by the person is 0.1×0.1 . The insurance company charges the person $0.8X$, where X is the solution in the last question. What is the expected utility of the person if he buys the new policy?

Questions (11)–(12) A country has the production function $Y_t = AN_t^{0.5}K_t^{0.5}$ in period t , where Y_t is the output, N_t is the population, and K_t is the capital stock in period t . The depreciation rate is d , and the population growth rate is n . Saving rate is $s = S_t/Y_t$. Let C_t be the consumption in period t . The per-person output, per-person capital stock, and per-person consumption are $y_t = Y_t/N_t$, $k_t = K_t/N_t$, and $c_t = C_t/N_t$. The steady state value of c_t is c^* .

(11) Write c^* as a function of A , n , s , and d .

(12) How would c^* change when foreigners increase their investment on the country's capital stock this year?

Questions (13)–(14) Suppose there are only two countries in the world: J and S . The currency used in J is called J -dollar, and the currency used in S is S -dollar. Suppose country J produces and exports only cameras, and country S produces and exports only barrels of oil. The real exchange rate is 4 barrels of oil for 1 camera. The price of camera in country J is P_J units of J -dollar. The price of a barrel of oil in country S is P_S units of S -dollar.

(13) In the equilibrium, how many units of S -dollar is equal to 1 J -dollar?

(14) Suppose the nominal exchange rate is fixed at the above level, and there is a recession in J . If the central bank in J adopts an expansionary monetary policy while keeping the nominal exchange rate fixed, how would the policy affects the economy in J ?

Questions (15)–(16) Suppose an economy is in full-employment equilibrium. Let S_p be the saving of households (private sector), and $T - G$ be the government saving, where T is the tax revenue, and G the government expenditure. The national saving is $S_p + T - G$.

(15) Suppose that national saving is \$1456 billion, investment is \$1945 billion, and private saving is \$1590 billion. How much is the current account balance?

(16) Suppose that the government cuts this year's tax by \$100 per person, but does not change the government expenditure. Under what condition will the national saving be the same as before the tax cut?