※ 考生請注意：本試題 ☑可 □不可 使用計算機

There are 25 questions in blank and each question is 4 points. 100 points in total.

Question 1. Suppose that one consumer has the following utility function:

$$u(x, y) = x^{\frac{1}{2}} y^{\frac{1}{2}}.$$

where x and y are two goods. Denote by p_x and p_y the prices of x and y, respectively.

(a) Suppose that the price of x is 10, the price of y is 10 and the consumer's income is 100. What are the optimal consumption bundle, denoted by $(x_1^*, y_1^*) = $ _____ and the consumer's maximum utility level achieved $u^* = $ _____ ?

(b) Find the optimal consumption bundle $(x_2^*, y_2^*) = $ _____ when the price of x drops to 5.

(c) Find the compensated bundle $(x_H^*, y_H^*) = $ _____ and the compensated income $(M_H) = $ _____. Write down the compensated budget line $(BL_H) = $ _____.

(d) Find the changes in demand of x due to the substitution effect and income effect $(\mathbf{SE}, \mathbf{IE}) = $ _____.

Question 2. A monopolist faces a market demand given by $Q = 40 - p$, where Q and p are the market output and price, respectively. The firm has a cost of

$$TC(Q) = Q^2 + 8Q.$$

(a) Derive the monopoly output level, market selling price and the firm's monopoly profit $Q^m, p^m, \pi^m = $ _____.

(b) Calculate consumer surplus, producer surplus, and deadweight loss $(\mathbf{CS}, \mathbf{PS}, \mathbf{DWL}) = $ _____.

(c) Suppose that this firm can employ a "*perfect* price discrimination" strategy. Then how much can the firm earn $\pi^m = $ _____?

(d) Suppose that the monopolist builds a new and more efficient plant, called b, and its cost is

$$TC_b(q_b) = q_b^2 + q_b$$

where q_b is output produced in plant b. (Denote now by a, the plant's existing plant). Then derive

(i) the outputs produced in plants a and b, $(q_a, q_b) = $ _____

(ii) the market selling price, the firm's profit $(p, \pi) = $ _____.

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Question 3. Dr. Health has two types of patients, insured and uninsured. Their respective demand functions for office visits are:

$$q_i = 200 - 4p_i \qquad \text{and} \qquad q_u = 200 - 8p_u$$

where p_i and p_u are the prices he charges insured and uninsured patients, and q_i and q_u are the visits of insured and uninsured patients, respectively. His average cost for office visits is given by $AC(Q) = 0.1Q$, where $Q = q_i + q_u$.
(a) If Dr. Health can maintain separation between the two types of patients, what are the optimal number of visits, and price for the uninsured patients $(q_u^*, p_u^*) = $ _____? What are the optimal number of visits , and price for the insured patients $(q_i^*, p_i^*) = $ _____? What is his total profit $\pi^* = $ _____?
(b) If Dr. Health can't price discriminate these two types of patients (i.e. he has to charge the same price for either type of patients), then what are the optimal price and number of visits $(p^*, Q^*) = $ _____? What is Dr. Health's profit $\pi = $ _____?

Question 4. Zipperland produces only two goods: oranges and video games. The quantities and these goods produced and their prices in 2009 and 2010 are:

Good	2009 quantity	2009 price	2010 quantity	2010 price
Oranges	50	$1.00	45	$2.00
Video games	5	$10.00	7	$8.00

Let 2009 be the base year. Calculate the following:
(a) Zipperland's nominal GDP in 2009 and 2010 (____ , ____).
(b) The chain-weighted output index in 2010 and the growth rate of real GDP in 2010 (____ , ____).
(c) The GDP deflator in 2010 and the inflation rate in 2010 (____ , ____).

Question 5. In the economy of Zipperland, the marginal propensity to consume is 0.9, investment is $50 billion, government purchases of goods and services are $40 billion, and lump-sum taxes are $40 billion. Zipperland has no exports and no imports.
(a) What is the value of government purchases multiplier (_____)?
(b) The government cuts its purchases of goods and services to $30 billion. What is the change in equilibrium expenditure (_____)?
(c) What is the value of the lump-sum taxes multiplier (_____)?
(d) The government continues to purchase $40 billion worth of goods and services and cuts lump-sum taxes to $30 billion. What is the change in equilibrium expenditure (_____)?
(e) The government simultaneously cuts both its purchases of goods and services and lump-sum taxes to $30 billion. What is the change in equilibrium expenditure (_____)?