國立高雄大學 103 學年度研究所碩士班招生考試試題

科目：個體經濟學　　系所：應用經濟學系　　是否使用計算機：否
考試時間：100 分鐘　　本科原始成績：100 分

1. Consider a consumer has the utility function

$$U(x_1, x_2) = x_1 + x_1 x_2$$

where x_1 and x_2 are the quantities of good 1 and good 2 consumed, respectively. This consumer has an income of $\$Y$ and the prices of good 1 and good 2 are P_1 and P_2. (Note: $Y > P_1$, $Y > P_2$, $P_1 > 0$, and $P_2 > 0$)

   (a) Derive the consumer's demand function for each good as a function of Y, P_1 and P_2. (12%)
   (b) Is x_2 a normal good or an inferior good? Why? (4%)
   (c) Are x_1 and x_2 substitutes or complements? Why? (4%)

2. Suppose a representative consumer has preferences for x_1 and x_2 given by the utility function:

$$U(x_1, x_2) = (x_1 - 5)(x_2 - 10)$$

Suppose the price of x_1 is \$10 and the price of x_2 is initially \$5. The consumer has a budget of \$600 per week.

   (a) Solve for the optimal x_1 and x_2. (10%)
   (b) Suppose that the government imposes a quota on x_2 of 30 units per week. Please show that the quota makes the representative consumer worse off. (5%)
   (c) Compute the equivalent variation of the quota to show the impact of the quota on the representative consumer. (5%)

3. All firm in a competitive industry has a long-run cost function

$$C(q) = q^3 - 5q^2 + 10q$$

where q is the output of each firm.

   (a) Compute the long-run equilibrium output of each firm and market price. (10%)
   (b) Suppose the market demand is

$$Q = 200 - 2p$$

where Q is the total output of the industry. Compute the long-run equilibrium number of

firms in the industry. (10%)

4. Suppose there are two firms, A and B, produce homogeneous good and each has a cost function

$$C_A(q_A) = 100 + 5q_A$$
$$C_B(q_B) = 50 + 10q_B$$

Suppose the (inverse) demand for the product is

$$P(Q) = 120 - Q$$

where $Q = q_A + q_B$.

(a) Determine the Cournot equilibrium. (10%)
(b) Suppose firm A is the leader of the industry. Determine the Stackelberg equilibrium. (10%)

5. Suppose the (inverse) market demand for steel is

$$P(Q) = 120 - 5Q$$

The marginal production cost function is

$$MC_p(Q) = 5Q$$

and the damage function of marginal pollution is

$$MC_d(Q) = 10Q$$

Without regulation, compute the values of social welfare to determine whether social welfare is greater under perfectly competitive market or under monopoly? (20%)