Intermediate Microeconomics
Midterm
Fall 2007

I. Multiple Choice (單選題，共二十分)

1. ______ Which of the following is a positive statement?
   (A) Intermediate microeconomics should be required of all business majors in order to build a solid foundation in economic theory. (B) The minimum wage should not be increased, because doing so would increase unemployment. (C) Smoking should be restricted on all airline flights. (D) All automobile passengers should be required to wear seatbelts in order to protect them against injury. (E) None of the above.

2. ______ Ice cream can be frozen. In the short run the magnitude of the own price elasticity of demand for ice cream (A) is higher than in the long run. (B) is lower than in the long run. (C) is the same as in the long run. (D) does not depend on the fact that ice cream can be frozen.

3. ______ If someone’s indifference curves cross, then (A) the assumption of a diminishing marginal rate of substitution is violated. (B) the assumption that more is preferred to less is violated. (C) the assumption of completeness is violated. (D) consumers minimize their level of satisfaction.

4. ______ Which of the following is true about a consumer’s optimum when indifference curves are concave to the origin?
   (A) Both goods are consumed. (B) No goods are consumed. (C) Only one of the goods is consumed. (D) It occurs at the point of tangency with the budget line.

5. ______ Jane is attempting to maximize utility by selecting a market basket of goods. For each of the goods in the market basket the marginal utility per dollar spent is equal. There are some goods which are affordable but do not appear in Jane’s market basket. If Jane has maximized utility, the marginal utility per dollar spent on each of the goods that does not appear in the market basket is (A) too high. (B) too low. (C) zero. (D) infinite. (E) None of the above.
II. Numerical Analysis

1. (15 points) The following table shows the nominal annual cost of a college education in the U.S. at a private four-year college (including room and board) and the Consumer Price Index for 1980-2002.

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</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>100</td>
<td>130.58</td>
<td>158.56</td>
<td>184.95</td>
<td>219.66</td>
</tr>
<tr>
<td>College Education</td>
<td>$4,912</td>
<td>$8,202</td>
<td>$12,018</td>
<td>$16,207</td>
<td>$18,273</td>
</tr>
</tbody>
</table>

(a) Calculate the real price (i.e., real cost) of college education in 1980 dollars.
(b) What is the percentage change in the real price (in 1980 dollars) from 1980 to 2002?
(c) Convert the CPI into the year 1990 = 100.
(d) Calculate the real price of college education in 1990 dollars.
(e) What is the percentage change in real price (in 1990 dollars) from 1980 to 2002?
(f) Compare your answers in (b) and (e). What do you notice? Explain.

2. (25 points) According to reliable empirical studies, the demand and supply curves in the world oil market are approximately linear and can be characterized by the following data:

- 1997 world price = $18 per barrel
- World demand and total supply = 23 billion barrels per year (bb/yr)
- OPEC supply = 10 bb/yr
- Competitive (i.e., non-OPEC) supply = 13 bb/yr
- Short-run price elasticity of world demand = $0.05$
- Short-run price elasticity of competitive supply = 0.10$
- Long-run price elasticity of world demand = $-0.40$
- Long-run price elasticity of competitive supply = 0.40$

(a) Find the short-run world demand curve.
(b) Find the short-run competitive supply curve.
(c) Find the short-run total supply curve. [NOTE: The short-run total supply is the sum of short-run competitive supply and OPEC supply.]
(d) Find the long-run world demand curve.
(e) Find the long-run competitive supply curve.
(f) Find the long-run total supply curve. [NOTE: The long-run total supply is the sum of long-run competitive supply and OPEC supply.]

(g) In 2002, Saudi Arabia accounted for 3 billion barrels per year of OPEC's production.

Suppose that war or political upheaval caused Saudi Arabia to stop producing oil.

(i) What would happen to the world price of oil in the short run?
(ii) What would happen to the world price of oil in the long run?

(h) Suppose that the long-run world demand for oil falls by 20 percent while the long-run total supply remains the same as in Part (f). What would happen to the world price of oil in the long run?
3. (30 points) Jane lives in a dormitory that offers chips (denoted by $x$) and soft drinks (denoted by $y$) for sale in vending machines. Her utility function is $U(x, y) = 4xy$, where $x$ denotes the number of bags of chips per week and $y$ the number of soft drinks per week. Chips are priced at $0.25$ per bag and soft drinks are priced at $0.50$ each. Suppose that Jane has $5$ per week to spend on chips and soft drinks.
(a) Write down Jane's budget constraint. Graph the budget line in a figure with chips placed on the horizontal axis and soft drinks on the vertical axis.
(b) Find Jane's optimal consumption bundle. Denote the optimal consumption bundle by $A$ and indicate it in the figure.
(c) Calculate Jane's utility level at the optimal consumption bundle, $A$.
(d) Draw the indifference curve passing through the optimal solution, $A$. Denote this indifference curve by $U_1$.
(e) Now suppose that the price of chips increases to $0.50$ per bag. Write down Jane's new budget constraint. Draw the new budget line in the figure.
(f) Find Jane's new optimal consumption bundle. Denote the new optimal consumption bundle by $B$ and indicate it in the figure.
(g) Calculate Jane's utility level at the new optimal consumption bundle, $B$.
(h) Draw the indifference curve passing through the new optimal solution, $B$. Denote this indifference curve by $U_2$.
(i) Decompose graphically the change in consumption of chips into substitution effect and income effect.
(j) Calculate the numerical values of the substitution effect and income effect.

4. (10 points) Tom goes to the gym 20 times a month. His income is $1,000$ per month and his visits to the gym cost $4$ per visit.
(a) Draw Tom's budget line for visits to the gym and money to be spent on all other goods in the following figure. In the figure, mark the consumption bundle that maximizes Tom's satisfaction and draw the indifference curve through that point.
(b) Recently, a new health club opened which offers identical facilities but which charges a flat fee of $60$ per month plus an additional $1$ per visit. Draw Tom's budget line if he joins this new club.
(c) Would Tom continue to go to the gym or would he join the new health club? Explain.

$\text{(to be spent on all other goods)}$

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption{Budget line for visits to the gym and money to be spent on all other goods.}
\end{figure}
6. Assume that beer is an inferior good and the price of beer rises, then the substitution effect results in the person buying _____ of the good and the income effect results in the person buying _____ of the good.
(A) more, more  (B) more, less  (C) less, more  (D) less, less

7. Suppose that a consumer regards two types of soaps as perfect substitutes for each other. The price consumption curve generated by changing the price of one type of soap (A) is always upward sloping.  (B) is always horizontal.  (C) is always vertical.  (D) overlaps the axis corresponding to the cheaper soap.  (E) overlaps the axis corresponding to the more expensive soap.

8. Match the following descriptions of preferences to the indifference curve diagrams that follow.

_____ Ann does not care whether she has more diet soft drinks or fewer diet soft drinks.

_____ Peter is very picky about his buttered popcorn. He tops every quart of popped corn with exactly one quarter cup of melted butter.

_____ Amy likes M&M's, plain and peanuts. For Amy, the marginal rate of substitution between Plain and peanut M&M's does not vary with the quantities of plain and peanut M&M's she consumes.

_____ George dislikes broccoli and would be willing to pay something to not have to eat it.

_____ Natalie likes rap and rock music. Natalie's preferences exhibit a diminishing marginal rate of substitution between the two types of music.

_____ Matthew knows his limit. He likes beer up to a point, but if he drinks too much he gets sick.