Econ 103: Principles of Microeconomics
Midterm (version a), 3 March 2016

Name (Last)                                      (First)  
Student #  

Part A: Choose the best answer for the following 25 questions. Make only one choice for each question. (50 marks)

1. If there is always a two-for-one trade-off between the production of good X and Y, then the PPC between X and Y is:
   A). a downward sloping curve convex to the origin
   B). a downward sloping straight line that is broken at one point
   C). a downward sloping straight line
   D). a downward sloping curve concave to the origin

2. An economist tells you that people in Canada have an average level of personal debt that is too high. This is an example of a(n):
   A). dependent statement
   B). normative statement
   C). positive statement
   D). independent statement

3. Scarcity is likely to be:
   A). a problem that will be solved by proper use of available resources
   B). unique to the twentieth century
   C). a problem that will always exist
   D). a result of the work ethic

4. A point lying inside the production possibilities curve is one at which:
   A). the economy is using its resources efficiently
   B). it is not possible to produce more output with existing resources
   C). the economy has run out of resources
   D). more output could be produced with existing resources

5. Suppose you are shown two demand curves that are drawn on the same scale. One of the demand curves is steeper than the other. Which of the following could explain the difference in slopes?
   A). the steeper one has a higher income elasticity of demand
   B). the steeper one is probably the demand curve for luxury good
   C). the steeper one is short run and the flatter one is long run
   D). the flatter one is for a good with no close substitutes

6. The demand and supply equations are stated as Qd=500-0.1P, and Qs=440+0.3P respectively. The equilibrium quantity and price (Q*, P*) would be:
   A). 150, 150
   B). 485, 485
   C). 485, 150
   D). 150, 485
The demand schedule for museum admissions in a small city

<table>
<thead>
<tr>
<th>Price (per visit per person)</th>
<th>QD (thousands of people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10</td>
<td>2</td>
</tr>
<tr>
<td>$8</td>
<td>4</td>
</tr>
<tr>
<td>$6</td>
<td>6</td>
</tr>
<tr>
<td>$4</td>
<td>8</td>
</tr>
<tr>
<td>$2</td>
<td>10</td>
</tr>
</tbody>
</table>

Use the above table to answer Question 7 to 9.

7. The price elasticity of demand for museum admissions is:
   A). greater at lower prices than at higher prices
   B). relatively elastic at all points on the demand curve
   C). relatively inelastic at all points on the demand curve
   D). greater at higher prices than at lower prices

8. Between the prices of $8 and $10, the price elasticity of demand is:
   A). 0.33
   B). 0.67
   C). 1
   D). 2

9. Between the prices of $6 and $8, the price elasticity of demand is:
   A). 0.33
   B). 0.67
   C). 1
   D). 2

10. The price elasticity of demand for a product tends to be greater the:
    A). lower its price
    B). smaller the price of the product as proportion of the consumer’s income
    C). more close substitutes for it there are
    D). fewer close substitutes for it there are

11. If demand is inelastic, it is expected that an increase in price will cause TR to:
    A). decrease
    B). remain constant
    C). increase
    D). fall to zero

12. If the demand for a good fluctuates, but supply is constant, then which of the following combinations would generally yield the greatest price fluctuations?
    A). large demand fluctuations and elastic supply
    B). large demand fluctuations and inelastic supply
    C). small demand fluctuations and inelastic supply
    D). small demand fluctuations and elastic supply

13. Suppose that as price increases from $4.00 to $5.00, the quantity supplied rises from 500 to 1000 units. The price elasticity for this product is:
    A). 2.0
    B). 2.5
    C). 3.0
14. The imposition of a sales tax usually causes the price to consumers to _____, while the revenue of sellers _____.
   A). rise; remains unchanged
   B). rise; falls
   C). rise; rises
   D). fall; remains unchanged

15. The equilibrium price of natural gas would be $2.00, but to protect consumers the government has fixed the price at $1.50. At this fixed price, the quantity _____ will be greater than the quantity _____, resulting in a _____ of natural gas.
   A). demanded; supplied; surplus
   B). supplied; demanded; surplus
   C). demanded; supplied; shortage
   D). supplied; demanded; shortage

Use the above diagram to answer Questions 16 to 19.

16. A price ceiling set at $1.00 results in:
   A). a shortage of 20 units
   B). a shortage of 10 units
   C). a surplus of 10 units
   D). a surplus of 20 units

17. A price ceiling set at $2.50 results in:
   A). a shortage of 5 units
   B). a shortage of 10 units
   C). a surplus of 10 units
   D). no change to equilibrium

18. A price floor set at $2.50 results in:
   A). a shortage of 5 units
   B). a shortage of 10 units
   C). a surplus of 10 units
19. A price floor set at $1.00 results in:
   A). a shortage of 10 units
   B). a shortage of 20 units
   C). a surplus of 20 units
   D). no change to equilibrium

20. The consumers' burden associated with an excise tax will be least when demand is:
   A). elastic
   B). unit elastic
   C). perfectly elastic
   D). perfectly inelastic

21. If the income elasticity of demand for a good is -2.4, a 10 percent increase in income result in:
   A). a 24 percent increase in the quantity demanded
   B). a 2.4 percent increase in the quantity demanded
   C). a 240 percent increase in the quantity demanded
   D). a 24 percent decrease in the quantity demanded

22. If the price of gasoline rises from $0.55 to $0.64 per litre, and as a result the sales of Honda Civics
   that Canadian consumers purchase rises from 1200 to 1350 units per month. Then gasoline and Civics are:
   A). complements
   B). substitutes
   C). normal goods
   D). inferior goods

23. Suppose the equilibrium price of a gallon of milk is $3. If the government imposes a price floor of $4
    per gallon of milk, the
   A). quantity supplied of milk falls short of the quantity demanded.
   B). quantity supplied of milk exceeds the quantity demanded.
   C). supply increases.
   D). demand decreases.

24. Suppose the current equilibrium wage rate for landscapers is $5.65 in Little Rock; $6.50 in St. Louis
    and $8.05 in Raleigh. An increase in the minimum wage to $6.50 per hour causes unemployment of
    landscapers in
   A). Little Rock and St. Louis.
   B). only Raleigh.
   C). Little Rock, St. Louis, and Raleigh.
   D). only Little Rock.

25. Suppose the government imposes a production quota. As a result, 
   A). producer surplus increases.
   B). consumer surplus increases.
   C). marginal cost increases.
   D). the price decreases.
Part B: Answer all questions. MUST show all work at the space provided, otherwise, no mark will be given. (53 marks)

1. Demand and supply. Market for tomatoes is: (43 marks)

<table>
<thead>
<tr>
<th>Price</th>
<th>Q:</th>
<th>Q:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>15</td>
<td>38</td>
<td>20</td>
</tr>
</tbody>
</table>

(a). Calculate the equilibrium P and Q. Calculate E_d and E_s at equilibrium. (8 marks)

\[
\begin{align*}
\text{D}_i &= 
0 + \frac{60 - 40}{5 - 10} 
\Rightarrow 
P &= 60 - 4P \\
\text{S}_i &= 
0 + \frac{15 - 20}{5 - 10} 
\Rightarrow 
P &= 15 + 2P \\
60 &= 60 - 4P \\
15 &= 15 + 2P \\
7P &= 45 \\
P &= 6.42857 \\
Q &= 3.2 \\
E_d &= 1 - 4 \left( \frac{12}{3.2} \right) \\
E_s &= 2 \left( \frac{12}{3.2} \right) \\
\end{align*}
\]

\[
\text{\textit{Note: }} E_d = \frac{P - P^*}{P^*} \quad \text{and} \quad E_s = \frac{Q - Q^*}{Q^*}
\]

\[
\begin{align*}
\text{\textit{Where: }} P^* &= \text{Equilibrium price} \\
Q^* &= \text{Equilibrium quantity}
\end{align*}
\]
(b). Calculate P and Q on demand curve that maximizes TR. Calculate TR. (5 marks)

\[ E_{xq} = 1 - 4 \frac{P}{Q} = 1 \implies Q = 4P^2 \]

\[ 4P = 80 - 4P \]
\[ 8P = 80 \]
\[ P = 10 \]
\[ Q = 40 \]

\[ TR = 10(40) = 400 \]

(c). Calculate the cross elasticity if demand of tomato shifts to \( Q_d = 83 - 3P \) when price of green peppers decreases by 12%. Are tomato and green pepper substitute goods? Explain. (6 marks)

(i) new \( Q_d = 83 - 3P \)

\[ 75 = 3P \]
\[ P = 25, \quad Q' = 38 \]

\[ \% \Delta Q_P = \frac{38 - 32}{32} \times 100\% = 18.75\% \]

(ii) \( \% \Delta P = -12\% \)

(iii) \[ E_{x} = \frac{18.75\%}{-12\%} = -1.56 < 0 \]

\( E_x < 0 \implies \) tomato and green pepper are complements.
Use the original demand and supply in part (a) to answer part (d) and (f).

(d). Government fixes the price at $10 per unit. Calculate $P_C$, $Q_C$, $P_P$, $Q_P$, $\triangle CS$, $\triangle PS$, $\triangle GR$, and $DWL$, and indicate the last four using a clearly labeled diagram. (8 marks)

\begin{align*}
\text{at } P = 10: & \quad \triangle CS = 8 + 2(10) = 28 \\
\text{at } Q = 28: & \quad \triangle PS = 80 - 4P = 16 \\
& \quad P = 13 \\
& \quad P_C = P_P = 10 \\
& \quad Q_C = Q_P = 28
\end{align*}

\begin{align*}
\triangle CRS &= 2(28) - \frac{1(4)}{2} = 54 \\
\triangle PSC &= \frac{(28 + 32)(2)}{2} = 60 \\
\triangle GRS &= \frac{3(4)}{2} = 6 \\
DWL &= 0.5
\end{align*}
(e) Calculate sellers' TR for the above policy. Indicate the area for TR here. (4 marks)

\[ TR = \frac{10 \times 2}{2} = 10 \times \frac{28}{2} = \frac{280}{2} = 140 \]
(f). The government should tax the industry at $3 per pound. Calculate $P_c$, $Q_c$, $P_p$, $Q_p$, $\Delta CS$, $\Delta PS$, $\Delta GR$, and DWL, and indicate the last four using a clearly labeled diagram. (8 marks)

\[
P'_p = P_c' - 3
\]

\[
\text{new } S: \quad \Delta \omega' = 8 + 2 (P_c' - 3) = 2 + 2 \beta
\]

\[
\text{new } \theta_{\delta} : \quad 8\theta - 4 P' = 2 + 2 \beta P_c'
\]

\[
\theta = 6 P_c'
\]

\[
P_c' = 13
\]

\[
P_p' = 10
\]

\[
Q_c' = Q_p' = 2.8
\]

\[
E = - \frac{(28 + 32)(1)}{2} = -36
\]

\[
E = - \frac{(28 + 32)(2)}{2} = -60
\]

\[
E = + 3(28) = 84
\]

\[
E = - \frac{3(4)}{2} = -6
\]
(g). Based on your answers in (f), is demand more inelastic compared to supply? Explain. (4 marks)

\[
\text{tax paid by buyers} = \left[ \begin{array}{c} \text{a} \\ \text{b} \end{array} \right] = \$1(28) = \$28
\]

\[
\text{tax paid by sellers} = \left[ \begin{array}{c} \text{c} \\ \text{b} \end{array} \right] = \$2(28) = \$56
\]

sellers paid more tax

\[ \therefore \quad F \quad \varepsilon_{01} > \varepsilon_{s} \]

2. Indicate whether the following statements are true, false or uncertain. Explain. (10 marks)
(a). "Producer surplus is the cost of producing a good minus its price."

\[ F \quad : \quad PS = MB - MC \]

\[ = P - MC \quad \uparrow \text{to a price} \]
If the price of beef rises, there will be an increase in both the supply of leather and the quantity of beef supplied.

- \( P_b \uparrow \Rightarrow Qs_b \uparrow \)

- Beef & cowhides are complements in production
  \[ \Rightarrow S \text{ of cowhides } \uparrow \]

- Cowhides is for leather
  \[ \Rightarrow S \text{ of leather } \uparrow \]