Student I.D. No. ☐☐☐☐☐☐☐☐☐☐☐

Seat No. Problem Set 1

Semester 2 Academic Year 2015

Course EE320

Total number of questions attempted Kitchai Saelee

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Marks			
1		6	
2		7	
3		8	
4		9	
5		10	
Total			

Question 1 (1.1) Fixed Cost = 5,000

Variable Cost = 7.5

Price = 10.

a)

Π = Revenue − Cost

= 10.Q − C(Q)

Q is amount of quantity.

$C(Q) = 5{,}000 + 7.5Q$

$\therefore \Pi = 10Q - 5{,}000 - 7.5Q$

$= 2.5Q - 5{,}000$

b) Break even Q such that $\Pi(Q) = 0$

$\therefore 2.5Q - 5000 = 0$

$Q = \frac{5000}{2.5} = \frac{50{,}000}{25} = 2000$ units.

(1.2) a) $TR = 40Q$.

b) $\Pi = 40Q - 2{,}000 - 20Q$

$= 20Q - 2000$

$\Pi = 0$ ⇒ $Q = \frac{2000}{20} = 100$ units.

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c) $\pi = 2000$

$\therefore 2000 = 20Q - 2000$

$4000 = 20Q$

$Q = 200$ units.

(2) a) Alex : $Q_d = 20 - p$, $0 \leq p \leq 20$

$= 0$; $p > 20$

Zander : $Q_d = 40 - 2p$, $0 \leq p \leq 20$

$= 0$; $p > 20$

Clark : $Q_d = 20 - 4p$; $0 \leq p \leq 5$

$= 0$; $p > 5$

$\therefore$ Market demand would be as follows.

$$Q_d^{Total} = \begin{cases} 80 - 8p & ; \quad 0 \leq p \leq 5 \\ 20 - p + 40 - 2p & ; \quad 5 < p \leq 20 \\ = 60 - 3p & \\ 0 & ; \quad p > 20 \end{cases}$$

b)

Supply = $Q_s = \frac{3}{2}p - 12$.

Setting supply equal to demand for each segment.

For segment $0 \leq P \leq 5$;

$\frac{3}{2}P - 12 = 80 - 8P$

$\frac{19P}{2} = 92$

17p / 2

$P = \frac{92 - 9}{19} = 9.68$

Wait!; but P must be in between 0, and 5.

So; this is not the equ^{n} of P^2.

For segment $5 < P \leq 20$

$\frac{3}{2}p - 12 = 60 - 3p$

$\frac{9p}{2} = 72$

$P = 16$ ✓ this is good!

$16 \in (5, 20]$

$\therefore p^* = 16 \Rightarrow Q_d^{Total,*} = 60 - 3p^* = 60 - 3(16)$

$= 60 - 48 = 12$ units

$p^* = 16$; $Q^* = 12$ units.

c) Alex & Zander stay in the market since $p^* = 18$. Clark is excluded because perrie is too high to attract him into the market.

Q3

$P_0 = 50$ $P_1 = 30$

$Q_0^C = 600$ $Q_1^C = 1,800$ Q^C = Chicken.

$Q_0^{soda} = 300$ $Q_1^{Soda} = 1500$ Q^{Soda} = Soda.

a) $$\varepsilon_p^{chicken} = \frac{1800 - 600}{30 - 50} \times \frac{50}{600}$$

$$= \frac{1200}{-20} \times \frac{50}{600} = -5$$

$|\varepsilon_p^{chicken}| = 5 \Rightarrow$ elastic demand.

b) $$\varepsilon_p^{Soda} = \frac{1500 - 300}{30 - 50} \times \frac{50}{300}$$

$$= -\frac{1200}{20} \times \frac{50}{300} = -10$$

$|\varepsilon_p^{Soda}| = 10 \Rightarrow$ elastic demand.

c) $P_0 = 50 \Rightarrow P_1 = 25$.

Suppose linear demand.

Since $P_1 = 25 < 30$.

Thus; $|\varepsilon_p^{Chicken}|$ should be greater than 5.

It is supposed to be elastic demand.

So; revenue should rise if you cut the price!

(a+b) Demand + Supply.

Q4 $Q^d = a + bp$; $Q^S = c + dp$

find Slope, b and d.

$$b = \frac{\Delta Q^d}{\Delta p} = \frac{4-0}{4-6} = -2$$

$$d = \frac{\Delta Q^S}{\Delta p} = \frac{80-120}{4-6} = 20.$$

$\therefore Q^d = a - 2p \Rightarrow p = 6, Q^d = 0$

$\therefore Q = 0 + 2(6) = 12$

$Q^d = 12 - 2p.$ #

$Q^S = c + 20p \Rightarrow p = 6\ Q^S = 120$

$120 = c + 20(6) \Rightarrow c = 0$

$\therefore Q^S = 20p.$ #

To be more preese:

$$Q^d = \begin{cases} 12 - 2p & ; 0 \leq p \leq 6 \\ 0 & ; p > 6 \end{cases}$$

$$Q^S = 20p \quad ; \quad p \geq 0$$

c) Identical

$$Q^{Total} = Q_1^{st} + Q_2^{nd} + \dots + Q_{10,000}^{th}$$

$$= \underbrace{(12-2p) + (12-2p) + \dots (12-2p)}_{10,000 \text{ times}}$$

$$= 10,000\,(12-2p) \quad ; \quad 0 \le p \le 6$$

$$\therefore Q^{Total}_{demand} = \begin{cases} 10000(12-2p) & ; \ 0 \le p \le 6 \\ 0 & p > 6. \end{cases}$$

d) Supply

$$Q^{S} = Q_1^{S} + Q_2^{S} + \dots Q_{10,000}^{th}$$

$$= \sum_{i=1}^{10,000} Q_i^{S}$$

$$= (10,000)(20p)$$

$$= (200,000)p$$

e) Eqm^{b} $Q^{Total}_{demand} = Q^{Total}_{supply}$

$$10,000\,(12-2p) = (20,000)(20p)$$

$$12 - 2p = 20p$$

$$p^* = \frac{12}{22}$$

$Q^* = (200,000)\left(\frac{12}{22}\right)$ # $\Rightarrow$ Each consumes $\frac{240}{22}$ #

~~consumes/produces~~ Each produces $\frac{240}{22}$ #

Subsidy

$p^d = p^s - 0.1$ ← Subsidy given to household

$\therefore \quad 10000(12 - 2p^d) = 10000(20p^s)$

$12 - 2(p^s - 0.1) = 20p^s$

$12.2 = 22p^s$

$p^s = 12.2/22 > \text{initial } p^*$

$p^d = \frac{12.2}{22} - 0.1$

$= \frac{9.81}{22} < \text{initial } p^*$ ← $\frac{10}{22}$

$\therefore$ Subsidy 0.1 \$/unit of production.

Equilibrium output is: $10000\left(20 - \frac{12.2}{22}\right)$

$= (200{,}000)\left(\frac{12.2}{22}\right)$

$\therefore \quad \text{Subsidy} = (0.1) \cdot Q^*$

$= (0.1) \cdot (200{,}000)\left(\frac{12.2}{22}\right)$

$= (20{,}000)\left(\frac{12.2}{22}\right)$ #

(a)

(5) IS: $y = C + I$

$$y = 48 + 0.8y + 98 - br$$

$$0.2y = 156 - br$$

$$y = \frac{780}{730} - 5br$$

LM: $M^S = M^d$

$$250 = 52 + 0.3y - 150r$$

$$r = \frac{-198 + 0.3y}{150}$$

(b) Eqn^m

$b = 75$ 730

$$\therefore y = 780 - 5(75)\cdot r$$

$$= 780 - 375r$$

$$y = 780 - 3.75\left(\frac{-198 + 0.3y}{150}\right)$$

$$= 780 + 498 - 0.75y$$

1.75 ← $0.25y = 1,275$ 1,225

$$y^* = 5100 \rightarrow 728.57 \quad = 700$$

(c) $b = 0 \Rightarrow$ Interest rate does not affect Aggregate Spending.

- Effect of monetary policy is then completely shut-down.
- monetary policy is not effective at all.

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Q: 6

(a) $14{,}000 - 10P = 2000 + 20P$

$12{,}000 = 30P$

$P = 400$ $

$Q = 10{,}000$ units

(b) Elasticity of demand $= \frac{\Delta Q}{\Delta P} \cdot \frac{P^*}{Q^*}$

$= (-10) \cdot \frac{400}{10{,}000}$

$= -0.40$

Elasticity of Supply $= \frac{\Delta Q}{\Delta P} \cdot \frac{P^*}{Q^*}$

$= (20) \cdot \frac{4000}{10000}$

$= 0.8$

Note here first from the calculation.

$|E_d| < |E_s|$

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$p^d = p^s + 15$

$\therefore \quad 14000 - 10p^d = 2000 + 20(p^s)$

$14000 - 10(p^s + 15) = 2000 + 20p^s$

$13,850 \quad -10p^s = 2000 + 20p^s$

$11,850 = 30p^s$

$p^s = 395$

$Q^* = 2,000 + 20(395)$

$= 9,900.$

$p^d = 395 + 15 = 410$

$\therefore$ Price gap = \$15.

Burden Consumer = 410 − initial price

= 410 − 400

= 10 \$ /unit

Burden Producer = 5 \$ /unit

Tax revenue = (15)(9900)

Consumer Pays = (10)(9,900) } added up = √

Producer Pays = (5)(9,900)

- Demand is less elastic than supply
- Demand bears more burden

(7) $Q_{d1} = Q_{s1} \Rightarrow 18 - 3P_1 + P_2 = -2 + 4P_1$ — ①

$Q_{d2} = Q_{s2} \Rightarrow 12 + P_1 - 2P_2 = -2 + 3P_2$ — ②

∴ ① $\Rightarrow$ $7P_1 - P_2 = 20$ — ③

② $\Rightarrow$ $5P_2 - P_1 = 14$ — ④

$5 \times$ ③ $\quad 35P_1 - 5P_2 = 100$ — ⑤

⑤ + ④ $\quad 34P_1 = 114$

$P_1^* = 3.35$

$P_2^* = 3.45$

plug P_1^*, P_2^* back to either demand / or / supply.
We obtain equ$^{\text{m}}$ quantity.

(8) a) Exo: I_0, T_0

Endo: y, C, G

b) g: marginal propensity to ~~govern~~ spend of government.

c) $y = a + b(y - T_0) + gY$

$\therefore y(1 - b - g) = a - bT_0$

$y^* = \dfrac{a - bT_0}{1 - b - g}$

d) ① $a - bT_0 \geq 0$

② $1 - b - g \neq 0$.