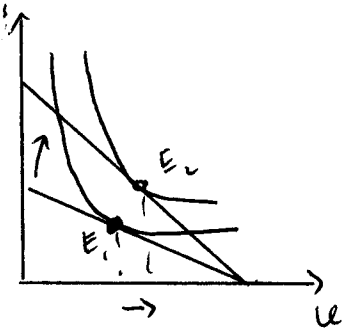
100 SOLUTIONS TO SECOND MIDTERM EXAM Winter 2001

Version A

1. (a) 

As drawn leisure ↑ so work ↓

(b) For saver when r ↑

(i) Sub effect r ↑
⇒ move from current to future cons.
⇒ save ↑

(ii) Income effect r ↑
⇒ income ↑
⇒ consumption ↑ in all periods
⇒ save ↓

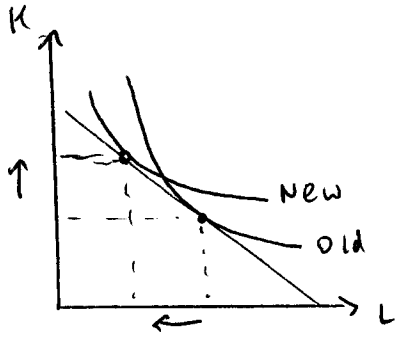
(c) Opportunity cost is the value of the most highly-valued foregone alternative.

2. (a) $MPP_L = \frac{dQ}{dL} = \frac{d}{dL}(5L^{.75}) = 5 \times .75 \times L^{-.25} = 3.75 \times (10{,}000)^{-.25} = \frac{3.75}{10} = .375$

(b) MC = # unit labor needed to produce 1 more table × cost of labor
$= (MPP_L)^{-1} \times \text{wage} = (.375)^{-1} \times 50 = \$133.33$

(c) First get MRS_{KL}.
$Q = K^{.25}L^{.75} \Rightarrow Q^4 = KL^3 \Rightarrow K = Q^4/L^3$
So $MRTS_{KL} = -\frac{dK}{dL} = 3Q^4/L^4 = 3\left(\frac{Q}{L}\right)^4 = 3\left(\frac{5{,}000}{10{,}000}\right)^4 = \frac{3}{16}$

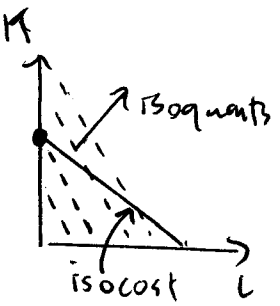
Also $P_L/P_K = \frac{50}{200} = \frac{1}{4}$. Mix is not optimal since $MRTS_{KL} \neq P_L/P_K$

3. (a) 

Isoquants flatten, as K ↓ needs more L ↑ to hold output constant. Then K ↑ and L ↓ as drawn

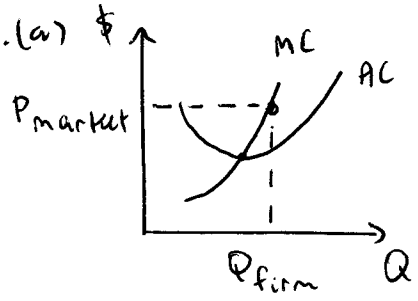
(b) Labor does ↓ due to substitution effect as switch to capital
But labor ↑ due to scale effect as cheaper production means produce more.

(c) Isoquants are straight lines
⇒ At corner where use all capital (as drawn) or all labor.



100 MT2 W 01

Version A (cont.)

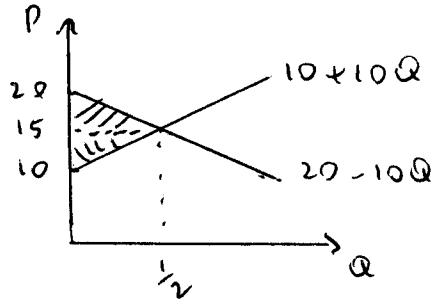
4.(a) 

(b) Due to a decreasing costs industry. As industry size expands, input prices fall, leading to lower costs for each firm and hence lower price.

(c) Increasing returns to scale if output more than doubles as inputs double. This favors large firms, so competitive market unlikely.

5(a) $D = S \Rightarrow 20 - 10Q = 10 + 10Q \Rightarrow 10 = 20Q \Rightarrow Q = \frac{1}{2} \Rightarrow P = 15$

500,000 cars at $15,000 each

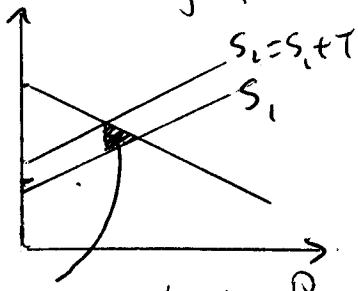
(b) 

$PS = \frac{1}{2} \times \frac{1}{2} \times 5 = 1\frac{1}{4}$

$CS = \frac{1}{2} \times \frac{1}{2} \times 5 = 1\frac{1}{4}$

Total surplus $= 2\frac{1}{2} =$ $2.5 billion

(c) P = price including tax



▲ = excess burden (welfare loss) of tax

Version B

1. Same as Version A

2.(a) See version A

(b) $MC = (MPP_L)^{-1} \times \text{wage} = (.375)^{-1} \times 50 =$ $266.67

(c) $MRTS_{HL} = 3/16$ (see version A).

$P_L/P_H = \frac{100}{200} = \frac{1}{2} \neq MRTS_{HL}$. Mix B not optimal

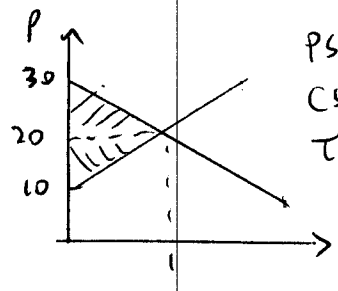
3 & 4 See version A

5.(a) $D = S \Rightarrow 30 - 10Q = 10 + 10Q$

$\Rightarrow 20 = 20Q$

$\Rightarrow Q = 1 \Rightarrow P = 20$

1,000,000 cars at $20,000

(b) 

$PS = \frac{1}{2} \times 1 \times 10 = 5$

$CS = \frac{1}{2} \times 1 \times 10 = 5$

Total surplus $= 10 =$ $10 billion

(c) See version A

Multiple Choice

Ques.	Version A	Version B	
1	a	a	[$MR = \frac{\Delta TR}{\Delta Q} = \frac{30\times 18 - 20\times 20}{30-20} = \frac{540-480}{10} = 14$].
2	a	b	
3	b	b	[$AC = Q^2 - 4Q + 9 \Rightarrow dAC/dQ = 2Q - 4 = 0$ at $Q = 2$]
4	c	d	
5	c	c	[Statutory incidence of tax does not matter].

Out of 40

75th 28

Med 26

25th 23

A	33	or better
A-	31	" "
B+	29	" "
B	27	" "
B-	25	" "
C+	23.5	" "
C	22	" "
C-	20.5	" "
D+	19	" "
D	18	" "
D-	17	" "