

## EXAMINATION #4 ANSWER KEY

### Version A

#### I. MULTIPLE CHOICE

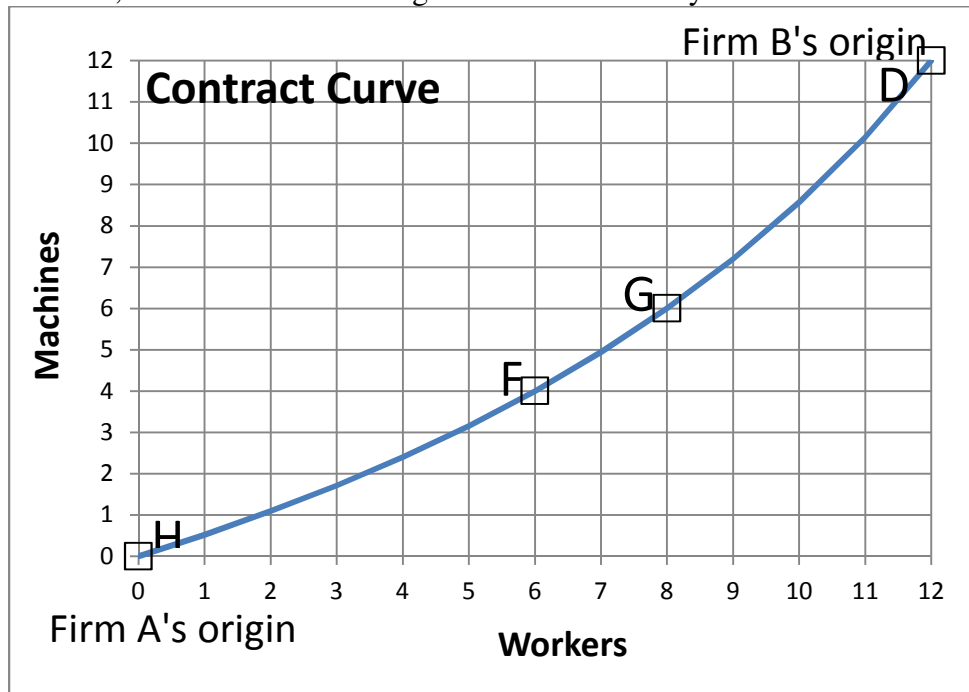
(1)e. (2)b. (3)a. (4)c. (5)c. (6)e. (7)b. (8)b. (9)b. (10)d. (11)b.

#### II. SHORT ANSWER

- (1) a. 20 units      b. 30 units      c. \$7.  
 (2) a. decrease    b. 12 units      c. 2 units      d. -2              e. \$10.  
 (3) a. \$1.45          b. increase      c. \$0.45 .  
 (4) a. \$60            b. \$24.  
 (5) a.  $\frac{1}{2}=0.50$     b.  $\frac{1}{20}=0.05$     c.  $\frac{1}{100}=0.01$ .

#### III. PROBLEMS

- (1) a.  $MRSP_A = x_{1A} / x_{2A}$  .              b.  $MRSP_B = x_{1B} / (2 x_{2B})$  .  
 C. inefficient, because MRSPs are not equal.  
 D. efficient, because corners of Edgeworth box are always efficient.  
 E. inefficient, because some inputs are unused.  
 F. efficient, because MRSPs are equal.  
 G. efficient, because MRSPs are equal.  
 H. efficient, because corners of Edgeworth box are always efficient.



- (2) a.  $MR = 15 - (Q/25)$                       b.  $Q^* = 300$                                       c.  $P^* = \$9$   
 d. Profit = \$1800                              e.  $DWL = \$900$                                       f.  $Q^* = 600$   
 g. Profit = \$3600                              h.  $DWL = \text{zero with perfect price discrimination.}$
- (3) a.  $Rev_1 = 15q_1 - \frac{q_1^2}{50} - \frac{q_1q_2}{50}$  .      b.  $MR_1 = 15 - \frac{2q_1}{50} - \frac{q_2}{50}$                       c.  $q_1^* = 300 - \frac{q_2}{2}$  .  
 d.  $q_1^* = 200$                                       e.  $Q^* = 400, P^* = \$7$                                       f. Profit = \$1600  
 g.  $DWL = \$400$ .
- (4) *This game is similar to the famous game "Battle of the Sexes."*  
 a. (1) Firm A chooses standard #1, Firm B chooses standard #1.  
     (2) Firm A chooses standard #2, Firm B chooses standard #2.  
 b. Neither player has a dominant strategy, so there are no DS equilibria.  
 c. (1) Firm A chooses standard #1, Firm B chooses standard #1.  
     (2) Firm A chooses standard #2, Firm B chooses standard #2.

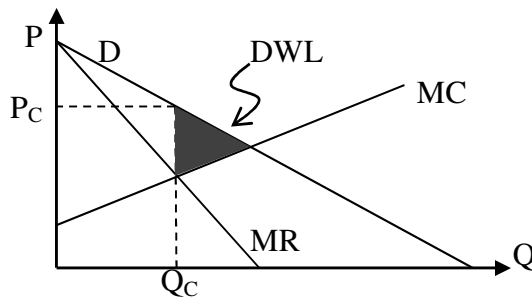
**IV. CRITICAL THINKING**

(1) An efficient (or Pareto-optimal) allocation must also satisfy the following two equations:

$$\frac{q_{1A}^{1/2}}{q_{2A}^{1/2}} = \frac{q_{1B}}{q_{2B}} = \frac{q_{1C}^2}{q_{2C}^2} .$$

These equations must be satisfied because efficiency requires that the marginal rates of substitution be equal for Adam, Becky, and Caleb. Otherwise, a trade could make at least one person better off without making anyone worse off.

(2) Profits are indeed higher under a well-functioning cartel but **consumer surplus is lower because prices are raised** to the monopoly level. There is **deadweight loss** because some consumers willing to pay the marginal cost do not buy the product. So the government should **not** encourage cartels.



**Version B**

**I. MULTIPLE CHOICE**

- (1)b. (2)e. (3)a. (4)b. (5)e. (6)e. (7)d. (8)c. (9)c. (10)a. (11)d.

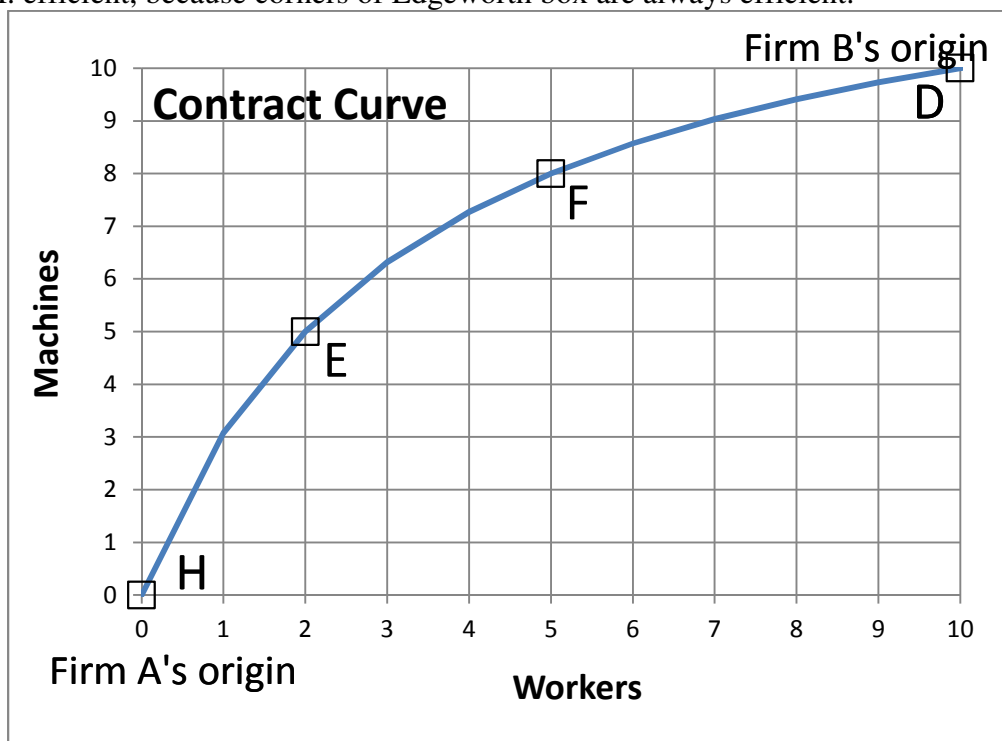
**II. SHORT ANSWER**

- (1) a. 40 units      b. 10 units      c. \$12.  
 (2) a. decrease      b. 8 units      c. 3 units      d. -3      e. \$15.

- (3) a. \$0.40      b. decrease      c. \$0.60 .  
 (4) a. \$40      b. \$25.  
 (5) a.  $\frac{1}{4}=0.25$       b.  $\frac{1}{8}=0.125$       c.  $\frac{1}{100}=0.01$ .

**III. PROBLEMS**

- (1) a.  $MRSP_A = x_{1A} / (4x_{2A})$       b.  $MRSP_B = x_{1B} / x_{2B}$  .  
 C. inefficient, because MRSPs are not equal.  
 D. efficient, because corners of Edgeworth box are always efficient.  
 E. efficient, because MRSPs are equal.  
 F. efficient, because MRSPs are equal.  
 G. inefficient, because some inputs are unused.  
 H. efficient, because corners of Edgeworth box are always efficient.



- (2) a.  $MR = 10 - (Q/50)$       b.  $Q^* = 300$       c.  $P^* = \$7$   
 d. Profit = \$900      e. DWL = \$450      f.  $Q^* = 600$   
 g. Profit = \$1800      h. DWL = zero with perfect price discrimination.
- (3) a.  $Rev_1 = 10q_1 - \frac{q_1^2}{100} - \frac{q_1q_2}{100}$       b.  $MR_1 = 10 - \frac{2q_1}{100} - \frac{q_2}{100}$       c.  $q_1^* = 300 - \frac{q_2}{2}$  .  
 d.  $q_1^* = 200$       e.  $Q^* = 400, P^* = \$6$       f. Profit = \$800  
 g. DWL = \$200.
- (4) *This game is similar to the famous game "Prisoner's Dilemma."*  
 a. (1) Firm A chooses high price, Firm B chooses high price.  
     (2) Firm A chooses high price, Firm B chooses low price.  
     (3) Firm A chooses low price, Firm B chooses high price.  
 b. (1) Firm A chooses low price, Firm B chooses low price.  
 c. (1) Firm A chooses low price, Firm B chooses low price.

**IV. CRITICAL THINKING**

(Same as Version A.)

**Version C**

**I. MULTIPLE CHOICE**

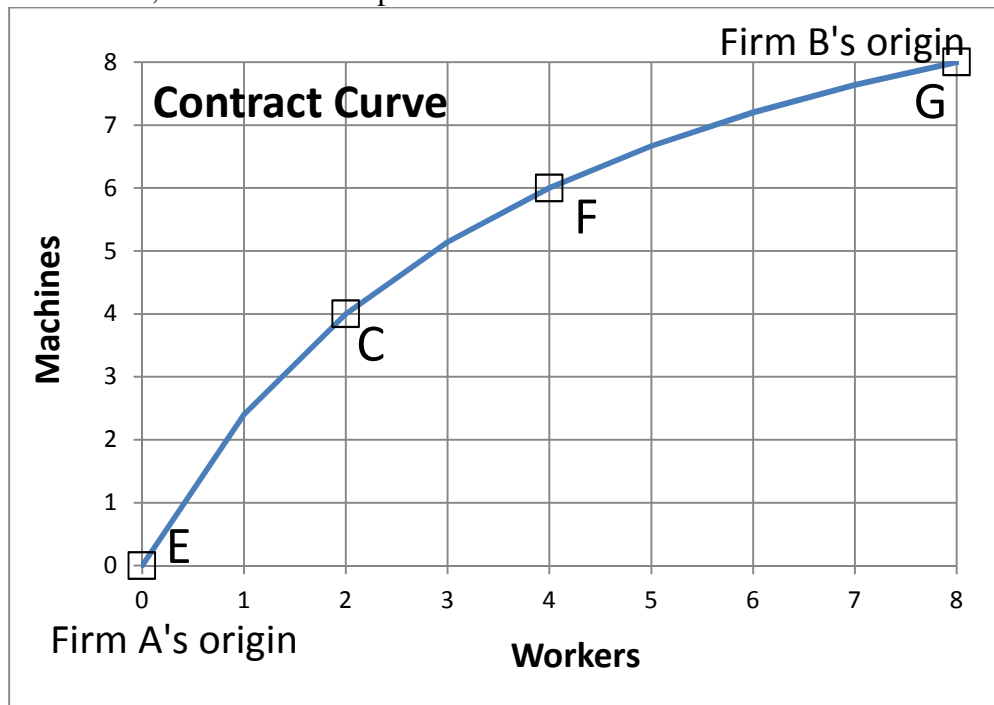
(1)c. (2)e. (3)b. (4)a. (5)b. (6)b. (7)a. (8)a. (9)a. (10)c. (11)a.

**II. SHORT ANSWER**

- (1) a. 10 units    b. 40 units    c. \$6.
- (2) a. decrease    b. 6 units    c. 4 units    d. -4    e. \$20.
- (3) a. \$0.90    b. decrease    c. \$0.10 .
- (4) a. \$30    b. \$22.
- (5) a.  $1/5=0.2$     b.  $1/10=0.1$     c.  $1/500=0.002$ .

**III. PROBLEMS**

- (1) a.  $MRSP_A = x_{1A} / x_{2A}$     b.  $MRSP_B = 3 x_{1B} / x_{2B}$  .  
 C. efficient, because MRSPs are equal.  
 D. inefficient, because MRSPs are not equal.  
 E. efficient, because corners of Edgeworth box are always efficient.  
 F. efficient, because MRSPs are equal.  
 G. efficient, because corners of Edgeworth box are always efficient.  
 H. inefficient, because some inputs are unused.



- (2) a.  $MR = 20 - (Q/10)$                       b.  $Q^* = 180$                                       c.  $P^* = \$11$   
d. Profit = \$1620                              e. DWL = \$810                                      f.  $Q^* = 360$   
g. Profit = \$3240                              h. DWL = zero with perfect price discrimination.
- (3) a.  $Rev_1 = 20q_1 - \frac{q_1^2}{20} - \frac{q_1q_2}{20}$  .    b.  $MR_1 = 20 - \frac{2q_1}{20} - \frac{q_2}{20}$                       c.  $q_1^* = 180 - \frac{q_2}{2}$  .  
d.  $q_1^* = 120$                                       e.  $Q^* = 240, P^* = \$8$                                       f. Profit = \$1440  
g. DWL = \$360.
- (4) *This game is similar to the famous game "Rock, Paper, Scissors."*  
a.        (1) Firm A chooses sleek design, Firm B chooses sleek design.  
          (2) Firm A chooses sleek design, Firm B chooses angular design.  
b.        Neither player has a dominant strategy, so there are no DS equilibria.  
c.        No Nash equilibrium in pure strategies.

#### IV. CRITICAL THINKING

(Same as Version A.)

[end of answer key]