Name: **KEY**
ECON 202—Montgomery College
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EXAM 3

- There are 110 possible points on this exam. The test is out of 100.
- You have two hours to complete this exam, but you should be able to complete it in less than that.
- Please turn off all cell phones and other electronic equipment.
- You are allowed a calculator for the exam. This calculator cannot double as a cell phone.
- Be sure to read all instructions and questions carefully.
- Remember to show all your work.
- Try all questions! You get zero points for questions that are not attempted.
- *Please print clearly and neatly.*

Part I: Matching. *Write the letter from the column on the right which best matches each word or phrase in the column on the left. You will not use all the options on the right and you cannot use the same option more than once.*
2 points each.

1. **A** Economies of scale
2. **H** Deadweight loss
3. **J** Demand curve
4. **L** Elimination principle
5. **C** Fixed cost
6. **F** Inelastic demand curve
7. **E** Monopolistic competition
8. **K** Nash equilibrium
9. **D** Prisoner's dilemma
10. **B** Variable cost

A. Average total costs fall as output expands
B. Example: a baker's cost of flour
C. Example: a game company's cost of designing a video game
D. Example: buying things only to "keep up" with your peers
E. Example: fast food companies
F. Example: housing
G. Example: the cost of what you could have earned had you started a different business
H. Gains that go to no one
I. Includes a normal amount of profit
J. Many marginal benefits
K. No one wants to change what they're doing
L. Predicts all competitors, in the long run, earn the same average amount
M. When ATC > MC.

1. *If a firm expands its output, and the cost per unit falls, that's what we call economies of scale. It's one reason why small firms expand easily and large firms expand slowly. Large firms are likely running into constant or even diseconomies of scale.*
2. *When there's an exchange despite MC > MB or no exchange even though MB > MC. In each case, there are unrealized gains.*
3. *A demand curve is a schedule of marginal benefits, in order of lower and lower marginal benefits.*
4. *If unusually large profits are eliminated by entry and unusually small profits are eliminated by exit, there's a natural equilibrium level of whatever the "normal" profit is. When that equilibrium is reached (the long-run), we expect all firms to, on average, make the same amount. Assuming perfectly competitive markets, of course.*
5. *This is a cost that doesn't expand as output expands. For a video game company, the cost of developing the video game is a fixed cost. It doesn't matter if one copy is sold or a million, the cost of making the video game is the same.*

6. *Housing has few substitutes and not something one can easily go without. The demand for housing is very inelastic.*
7. *Monopolistic competition describes the (common) scenario of similar, but slightly different, competing firms. There's freedom of entry and exit, but not all products are identical. Fast food is a great example of this.*
8. *Holding everyone else's action constant, would you change your behavior? If everyone says "no", that's Nash equilibrium.*
9. *A prisoner's dilemma describes a scenario when the rational actions by individuals lead to a suboptimal result. Arms races and attempts at collusion are examples. As is the endless "one-upmanship" of conspicuous consumption. If you save, you "fall behind" but everyone would be better off if everyone halved their spending and the signaling of prestige would be the same (as the signal is relative).*
10. *This is a cost that does expand as output expands. As a baker sells more product, she will have to buy more flour (assuming whatever she sells uses flour, which is very likely).*

Part II: Multiple Choice. *Choose the best answer to the following.*
3 points each.

11. Suppose a hurricane knocks over many trees, blocking the roads into a city and knocking out its power. What changes about the market for ice in the city?
    a. Its supply curve becomes more inelastic.
    b. Its demand curve becomes more elastic.
    c. Its demand curve becomes more inelastic.
    d. A & C
    e. None of the above

There are fewer substitutes for ice and it's become harder to bring ice into the city. Both make the good inelastic (for demand and supply respectively).

12. If a monopolistically competitive firm is making economic profits, what ***must*** happen in the long run?
    a. Demand shifts down until there are zero economic profits.
    b. Marginal cost shifts up until there are zero economic profits.
    c. Deadweight loss increases.
    d. A & C
    e. None of the above

Monopolistic competition means there is entry if a firm makes unusually high profits. This causes the demand for that firms profits to shift down and this entry continues until there are zero economic profits.

Note that if you fiddle with the Monopoly Model (link on my website under "Research"), shifting Demand down does changes DWL very slightly: it decreases it. This is because one side of the DWL triangle is the distance between Demand and Marginal Revenue. The distance between the two increases as quantity produced increases. When Demand shifts down, quantity produced decreases which reduces that vertical distance and thus decreases DWL.

13. In the aftermath of the 2014 mudslide in Oso, Washington, NPR ran a story concerning mudslide insurance.[1] Mudslide insurance, like mudslides themselves, is rare. Why? Because the insurance is very expensive—up to $1,000 per year, depending on the value of and risk to the home. According to Ron Fredrickson, manager of consumer advocacy at the state of Oregon's Insurance Division:

    > Insurance is basically risk-sharing. In order for it to work — and for it to be reasonably affordable — you have to have a large number of similar units that have similar possibilities of loss.

    In other words if more people bought mudslide insurance, mudslide insurance would be much cheaper. What does this information suggest about the mudslide insurance industry?
    a. It has diseconomies of scale
    b. It has decreasing marginal cost
    c. It has economies of scale
    d. A & B
    e. None of the above

The more people who buy mudslide insurance—the more people the insurance company covers—the cheaper mudslide insurance becomes. This bears a striking resemblance to our LRAC: as quantity provided increases, cost-per-unit provided decreases. This is economies of scale.

Given how few people are interested in mudslide insurance—independent of price—it is likely mudslide insurance would be a natural monopoly. But no firm exclusively provides the insurance (you get it through firms which insurance unusual items such as collectibles) so it's tricky to see it in practice.

14. How do monopolies make greater than average profits?
    a. By reducing the quantity sold.
    b. By forcing people to buy their good.
    c. By not having to spend any money on advertising.

[1] http://www.npr.org/2014/04/08/300267934/natural-disasters-are-rare-but-so-is-mudslide-insurance

d. B & C
e. None of the above

Artificially reducing how much is available in the market causes the price of the good to rise. Without competition, there is no one to undercut them or out-produce them.

15. Suppose the price of birdseed was \$6 for a large bag and 500 bags were sold. Then suppose that the price of the birdseed increased to \$8 and 200 bags were sold. Calculate the price elasticity of demand and determine the elasticity of demand.
    a. 3, elastic
    b. 1/3, elastic
    c. 1, unit elastic
    d. 3, inelastic
    e. 1/3, inelastic

Here's the equation:

$$\left|\frac{(500-200)/350}{(6-8)/7}\right| = \left|\frac{300/350}{-2/7}\right| = \left|\frac{6/7}{-2/7}\right| = \left|\frac{6}{-2}\right| = |-3| = 3, elastic$$

16. A Pigouvian subsidy is supposed to:
    a. Discourage people from producing a good
    b. Discourage people from demanding a good
    c. Encourage people to produce a good
    d. B & C
    e. None of the above

With a subsidy, the market will move along the supply curve and demand curves and (if done correctly) provide the optimal amount to the market (in the sense it's correcting for a positive externality).

17. Consider the game below. What could X be to ensure there are no Nash equilibria? (Note there are two Xs, meaning the payoff for each X would have to be the same.)
    a. 1
    b. 3
    c. 5
    d. A or C
    e. None of the above

		Zuko	
		Defend	*Attack*
Aang	*Defend*	X, 3	7, 4
	Attack	2, 4	8, X

If you choose 1, Aang would stay at Attack if Zuko Defends (2>1) and Zuko would stay at Defend if Aang Attacks (4>1); thus Attack/Defend is NE.

If you choose 5, Aang would stay at Attack if Zuko Attacks (8>2) Zuko would stay at Attack if Aang Attacks (5>4); thus Attack/Attack is NE.

But you won't get a Nash Equilibrium if you choose 3.

		Zuko	
		Defend	*Attack*
Aang	*Defend*	3, 3	7, 4
	Attack	2, 4	8, 3

18. Which of the following scenarios is an example of a prisoner's dilemma?
    a. Robbing a bank: one player is a robber (choosing between robbing and not robbing) and the other is the bank (choosing between high and low security).
    b. An arms race: the two players are countries (each choosing between a lot of military spending and a little military spending).
    c. A penalty kick in a soccer game: the two players are…players (the goalie chooses where to try to block the ball and the kicker chooses where to kick the ball).
    d. Meeting for lunch: the two players are old friends (each choosing between going to a coffee shop and going to a restaurant).
    e. None of the above

Both A and C are between two inherently opposing groups with no incentive for cooperation. For example, if the robber decides to rob the bank, the bank will want high security; that means the robber won't want to rob the bank which means the bank will want low security; that means the robber WILL want to rob the bank so the bank is back at high security… Similarly, any place the goalie tries to block is a place where the kicker doesn't want the ball to go. Any place the kicker decides where to kick the ball is a place the goalie wants to go.

Option D does not have one but two stable points of cooperation: both players can go to the restaurant or the coffee shop. The prisoner's dilemma has only one NE. There is no incentive to defect, either.

Option B is the best choice: both countries would be better off if they cooperated and built small militaries. But both sides have an incentive to defect on this arms race and build big militaries. If one builds a small military, the other will want a big one (so it can crush the small one). If one builds a big military, the other will want a big one (so it can defend itself). Big/Big is NE. But if they both built small militaries, they would be on equal footing *militarily-speaking but have save a lot of resources. (Note unlike the bank with the robber or two sides of a soccer match, two countries can get along.)*

19. The iconic blue-and-white Chinese porcelain sold to people all over the world (particularly between the 14^{th} and the 16^{th} centuries) was so successful, entrepreneurs in Persia, Netherlands, Syria, Iberia, Mexico, and many other areas attempted to copy it. The actual process for creating such high quality ceramics was kept secret but in 1708 a German alchemist finally found a way to replicate it the ancient art. What do you expect happen to the price of porcelain after 1708 and why?
    a. It should fall, because of the increased competition.
    b. It should fall, because of the lower cost to create Chinese porcelain.
    c. It should rise, because of the greater difficulty in keeping the method a secret.
    d. It should not change at all because demand and supply will react accordingly.
    a. None of the above

As suggested by the fact that the method of creating the porcelain was kept secret, by discovering the secret the price of porcelain should fall due to competition. Note that this discovery does not decrease the price of producing the good. It only increased competition.

20. Which of the following is an example of a fixed cost for a T-shirt business right when it gets started?
    a. Building a factory
    b. Purchasing more fabric for T-shirts
    c. Hiring additional workers
    d. A & B
    e. None of the above

Both B and C are examples of variable costs. With the business just starting, the cost of a factory will not vary with output.

21. Why is the average fixed cost always decreasing as quantity increases?
    a. Because fixed costs don't change.
    b. Because variable costs are constant.
    c. Because average fixed costs are determined by dividing by quantity.
    d. A & C
    e. None of the above

The equation for average fixed cost is Fixed Cost / Quantity. As Quantity increases, Fixed Costs are the same so the equation is always decreasing.

22. What determines who (supply or demand) pays the majority of a tax?

a. Who is legally assigned to pay the tax
b. The elasticity of supply
c. The elasticity of demand
d. B & C
e. None of the above

It being the elasticities relative to each other is the same as saying it is both elasticities.

23. On April 17, 2014, *Forbes* published an article by economist Michael Saltzman describing the economic research on the minimum wage.[2] The overwhelming body of research (roughly 85%) points to empirical evidence for increasing unemployment due to the minimum wage (just as theory would predict). Saltzman also notes:

    > [A] study published in the Journal of Human Resources found that a higher minimum wage can actually increase the proportion of families living at or near the poverty line, as the resulting reduction in work hours (or a loss of employment altogether) leads to less take-home pay rather than more.

    What idea does this lower actual wage represent?
    a. True price
    b. Deadweight loss
    c. Shortage
    d. Market price
    e. None of the above

That people get a lower compensation due to the minimum wage suggest their actual compensation is less than what it would be without the price floor. This is our true price (which, in the diagram, is lower than the market price when a price floor is set above equilibrium).

24. In July 2011, oil companies had a 6.5% profit margin (for each dollar of sales, 6.5 cents was profit), ranking 131. Other industries making the same profit margin included packaging & containers, office supplies, farm & construction, and newspapers. Assuming these profits are typical, what does this constant profit margin across very different industries suggest about oil companies' economic profit?

    a. They are making above-average economic profit and should expect entry.
    b. They are making above-average economic profits but should expect no entry or exit.
    c. They are making zero economic profit.

[2] http://www.forbes.com/sites/realspin/2013/04/17/the-record-is-clear-minimum-wage-hikes-destroy-jobs/

d. Nothing because it is the total revenue that matters, not profits per dollar of sales.
e. None of the above

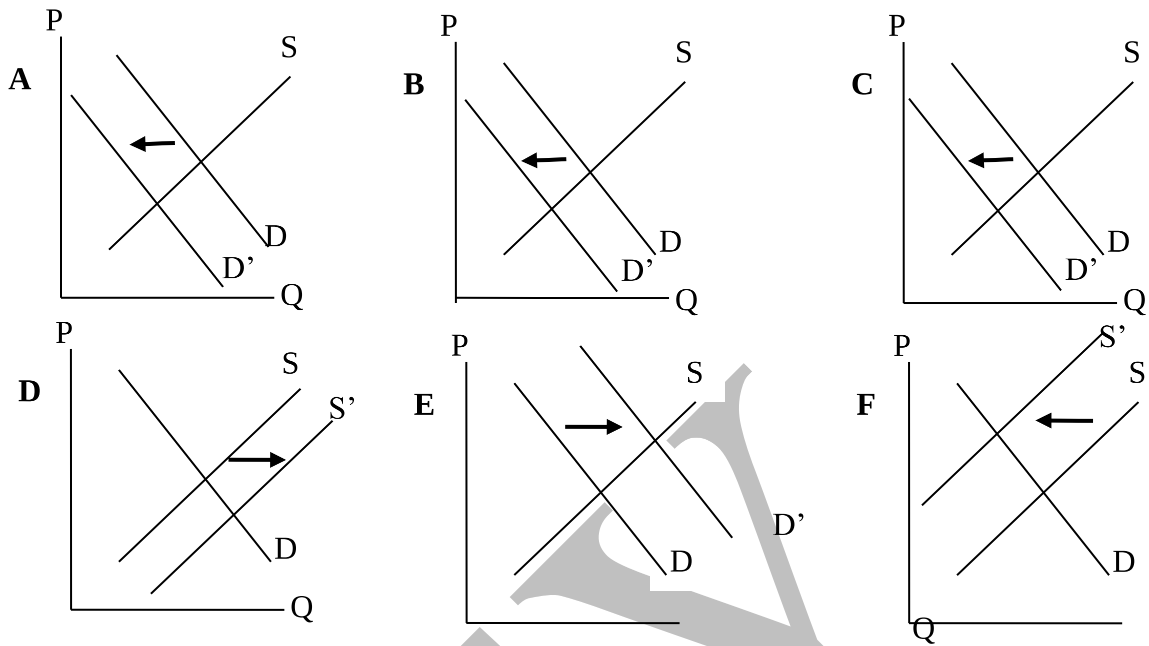
If they are making the same amount in oil production as they could anywhere else, then accounting profit equals opportunity cost, which means economic profit is zero.

Part III: Short Answer. *Answer the following.*
12 points each.

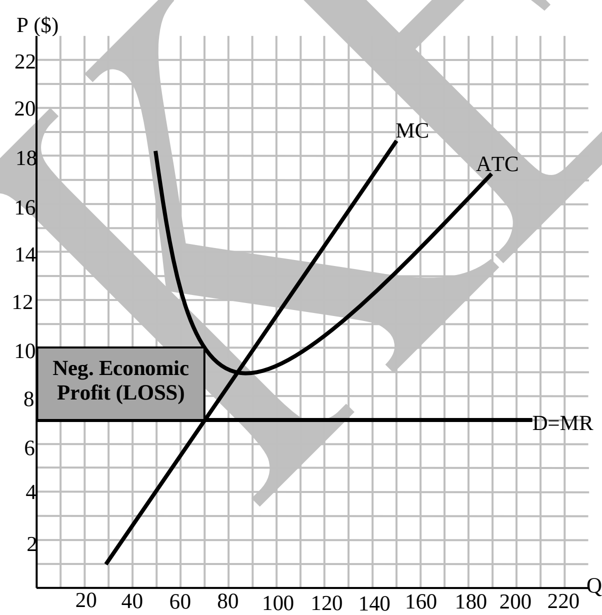
25. Using the diagrams below, illustrate the effects of the following (2 points each).
    a. The market for baseball tickets after a baseball player is accused of using steroids.
    b. The market for trees after people start recycling paper.
    c. The market for steel after the invention of a cheap way to purify aluminum.
    d. The market for food after the invention of the tractor.
    e. The market for healthcare after people continue to grow older and older.
    f. The market for cars after the government taxes steel imports.

Explanations (not required):

a. Fewer people want to go to a baseball game if there's steroid use. For most people, an increase in the perceived use of drugs decreases people's enjoyment.
b. If people recycle paper, trees become less valuable—recycled paper is a substitute for trees to the extent that trees are used to make paper.
c. Aluminum and steel are substitutes so if aluminum becomes easier to make, fewer people will want steel. The benefit of steel has decreased.
d. Tractors make food easier to make, or the marginal cost is lower. Thus supply falls.
e. As people grow older, they will want more healthcare since going to the doctor regularly is more important and going in for specific diagnostics and treatments is more frequent.
f. A tax on imports (a tariff) increases the price of buying steel. Since steel is an input to cars, higher steel prices increase the cost of making cars.



26. Consider a perfectly competitive firm. Using the graph below, indicate where the firm produces, where it makes a profit/loss and how much it is, if it should anticipate entry or exit, what price it sells its good, the price it will sell its good in the long-run, and any deadweight loss, if applicable.



The firm makes 70 units and sells at $7. There is no deadweight loss in this model as MR = Demand and Demand = MB; what’s in the interest of the firm is in the interest of society.

It should anticipate exit from the market because it is has negative economic profit. In the long-run, prices will rise and this firm (or one just like it) will have zero economic profit (at a price of around 9, where ATC = MC).

27. Circle the Nash equilibrium/equilibria (NE) of the following games. If there aren't any, check the box. (4 points each)

A)

		Nazi Germany		
		Attack North	*Attack Central*	□ **No NE**
France	*Defend North*	2,-2	-3,3	
	Defend Central	-5,5	4,-4	

In this game, there is no Nash equilibrium. The Nazis want to go where France isn't and France wants to go where the Nazis are. (By the way, what happened was that France Defended North and Nazi Germany Attacked Central in the Battle for France.)

B)

		Sam		
		Buy	*Sell*	□ No NE
Alex	*Stay*	5,5	**3,6**	
	Run	7,2	0,8	

Stay and Sell is NE. Sam won't want to go from 6 to 5 and Alex won't want to go from 3 to 0. All other points gravitate to this one.

C)

		Ingen		
		Up	*Down*	□ No NE
Initech	*Love*	2,2	0,3	
	Hate	3,0	**1,1**	

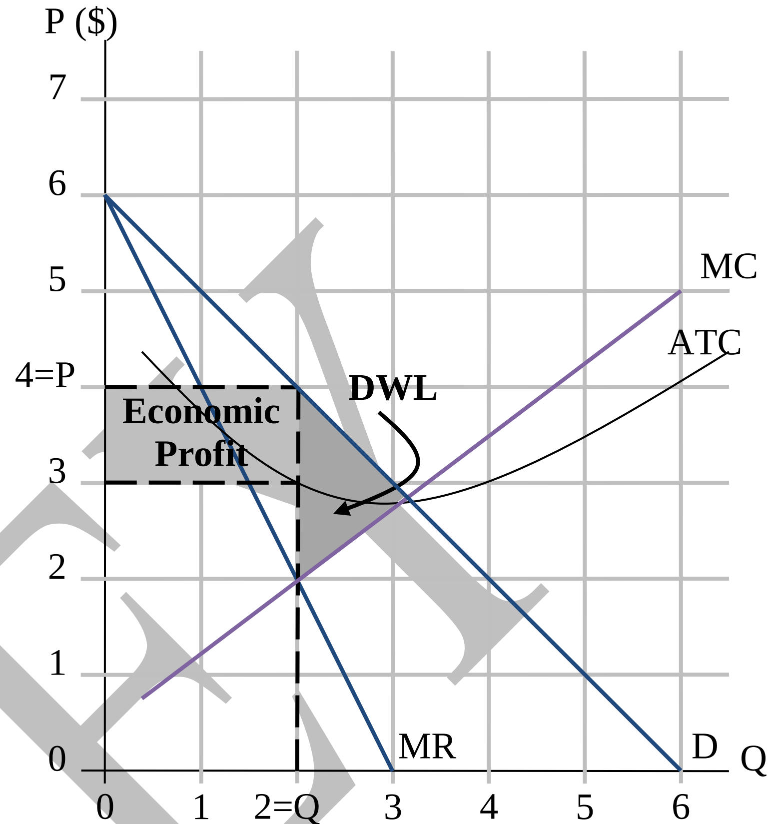
This is the prisoner's dilemma, though I gave the strategies some random names to mask it.

D)

		Betty		
		Rabbit	*Stag*	□ No NE
Alice	*Rabbit*	**1,1**	1,0	
	Stag	0,1	**3,3**	

This is a game called the stag hunt. Each player can go for a rabbit or a stag. You can be successful going after the rabbit alone but you need help to go after the stag. The stag hunt is sometimes brought up in management theory, the idea being employees could be stuck doing small things *individually and the manager's job is to get them to cooperate and go after the stag. But, unlike the prisoner's dilemma, cooperation is Nash equilibrium; it's easy to maintain cooperation once you get it established.*

28. Consider a long standing monopoly. Using the graph below, indicate where the firm produces, where it makes a profit/loss and how much it is, if it should anticipate entry or exit, what price it sells its good, and any deadweight loss, if applicable.



The firm makes two units, selling them at $4 each and costing them $3 each to make. The firm makes a total profit of $2. Despite its profit making status, there will not be entry since the monopoly is long standing: there is clearly some form of barriers to entry at work.