

Harvard Pre-Collegiate Economics Challenge
April 13th, 2019
Individual Round

Instructions: Please print your name and school on the Scantron provided. Ambiguous answers will be marked wrong. Only the answers on the Scantron will be scored. You have 90 minutes to complete this round. There are 60 multiple choice questions, with the correct answer being one and only one of the letters A, B, C, and D.

Each...	Will Receive...
Correct Answer	One (1) point
Incorrect Answer	Zero (0) points

You may mark, annotate, disassemble, or otherwise use the test in any way. All questions assume *ceteris paribus* (all other things being equal or held constant).

Part I: Microeconomics

1. A primary example of moral hazard is when:
 - a. **people behave more recklessly with insurance than without it**
 - b. a smoker manages to receive insurance coverage as a nonsmoker
 - c. a car dealer withholds from a buyer that a certain car is, in fact, defective (a "lemon")
 - d. hospitals refuse service to the poor

2. If a firm's production process exhibits diseconomies of scale, which of the following will occur when the firm's output increases?
 - a. Its short-run average total costs will rise
 - b. **Its long-run average total costs will rise**
 - c. Its long-run average total costs will fall
 - d. Its long-run total costs will fall

3. Which choice best explains why Pareto efficiency is an insufficient criterion for social justice?
 - a. because Pareto efficiency does not necessarily maximize the amount of surplus to be allocated
 - b. because if transfers are feasible, potential Pareto improvements can make everybody better off
 - c. because Pareto efficiency ensures that it is impossible to make one person better off without hurting someone else
 - d. **because an allocation where one person has all of the resources and all other people have nothing is still classified as Pareto efficient**

4. If sunk costs represent the key segment of a firm's fixed costs, then the firm is most likely
 - a. losing money, and should shut down
 - b. **operating in the short run**
 - c. highly profitable
 - d. losing money, but may not need to shut down

5. According to the Euler theorem, if the production function _____, then _____
 - a. exhibits increasing returns to scale, then the goods market is competitive
 - b. exhibits decreasing returns to scale, then the goods market is competitive
 - c. **exhibits constant returns to scale, both the factor market and the goods market are competitive**
 - d. exhibits constant returns to scale, the goods market is competitive

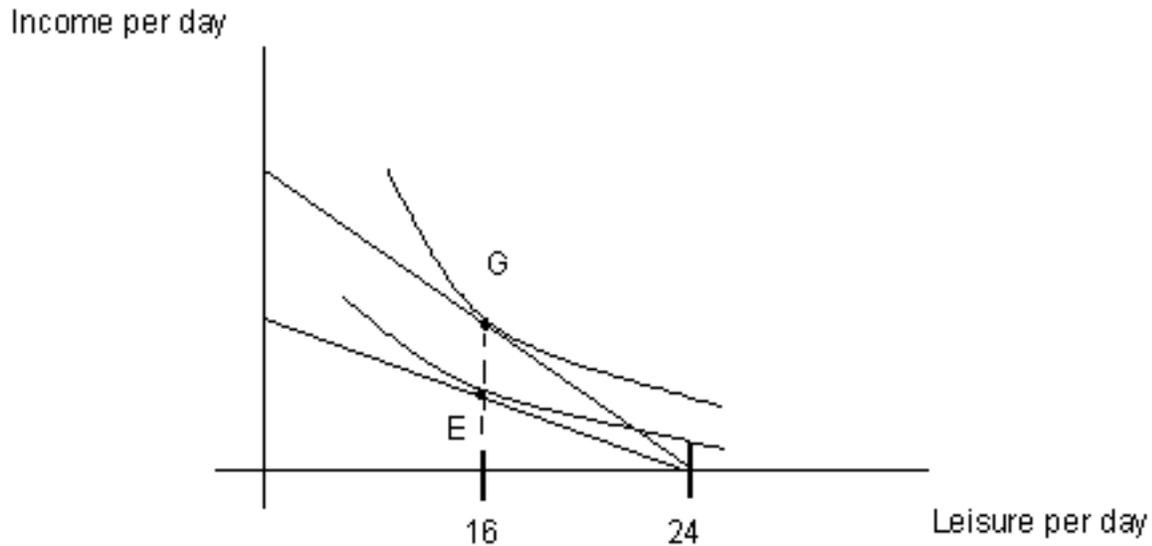
6. In a movie theatre, eating popcorn disrupts the experience of other viewers. This is an example of:
 - a. negative production externality
 - b. **negative consumption externality**
 - c. deadweight loss
 - d. a cause that decreases profit

Form A

7. When Emily has an income of \$1,000, she consumes 30 units of good A and 50 units of good B. After Emily's income increases to \$1,500, she consumes 60 units of good A and 45 units of good B. Which of the following statements is correct?
- Both goods A and B are normal goods
 - Both goods A and B are inferior goods
 - Good A is a normal good, good B is an inferior good**
 - Good A is an inferior good, good B is a normal good
8. The signaling model of education assumes that attending college will:
- improve the productivity only of people with high innate ability
 - improve the productivity only of people with low innate ability
 - not improve productivity**
 - improve the productivity of all people
9. In order to minimize losses whilst strategizing, a player might adopt which of these strategies?
- Minimax
 - Maximin**
 - Minimum
 - Maximum
10. In an infinite series version of the Prisoner's Dilemma, what is the necessary requirement of the discount rate that will generate a Nash equilibrium?
- Low**
 - High
 - 0
 - Infinite
11. If Nancy consumes shoes and books, a relatively _____ indifference curve will have a _____ effect in response to a change in the prices of either shoes or books.
- More curved, larger income
 - Less curved, smaller substitution
 - More curved, smaller substitution**
 - More curved, smaller income
12. There are two goods: Good A and Good B. They are close substitutes but not perfect substitutes. What will the Cross Elasticity of Demand look like if the price of the Good A will increase and the price of the Good B will remain unchanged?
- it will be equal to zero
 - it will be equal to infinity
 - it will be positive
 - it will be negative**
13. If all firms in a perfectly competitive industry have long run TC functions of $TC = 25 + Q^2$, and the market price is currently \$15, in the long run what will happen?
- Firms enter and producer surplus drops to zero
 - Firms enter and the market price drops to \$10**
 - Firms exit and firms make economic profit
 - Firms exit and the market price rises to \$20

14. There are two businesses that want to set up a lemonade stand on a beach of length 100 meters. Individuals on a beach will go to the closest lemonade stand to them. What is the Nash Equilibrium in this model?
- Both randomly select a location to set up their stand
 - There is no Nash Equilibrium
 - Set up at opposite ends of the beach
 - Both set up in the middle of the beach**

Question #15 refers to the diagram below.



15. If a worker receives \$5 per hour and chooses point E, daily income at this equilibrium point is:
- \$40**
 - \$65
 - \$80
 - \$120
16. The Condorcet Paradox illustrates Arrow's Impossibility Theorem by showing that pairwise majority voting schemes:
- Leads to dictatorial rule
 - Violates the condition that social preferences be transitive**
 - Violates the independence of irrelevant alternatives
 - Is inconsistent with the principle of unanimity
17. Which of the following would result in a decrease in the quantity demanded of Nestle Purina dog food? Assume that this product acts as a normal good.
- The world enters an economic recession and the unemployment rate increases dramatically.
 - A study is released to the public that shows Purina contains a compound which can be harmful to dogs in large concentrations.
 - The largest seller of Purina to consumers, PetSmart, decides to increase the price of the dog food from \$5 per bag to \$10 per bag.**

Form A

- d. Iams, one of Purina's competitors, releases a new formulation of dog food along with an aggressive marketing campaign.
18. Amin wins a \$150 Visa prepaid debit card in his school lottery. Normally, he allocates at least 50% of his earnings into his investment portfolio. However, since he wasn't expecting the money, he decides to make an exception. The very next day, he spends all of the money on bonsai trees, ramen, and lottery tickets. What behavioral economic phenomenon explains Amin's decision?
- sunk costs
 - gambler's fallacy
 - endowment effect
 - mental accounting**
19. The community of Selma, Kansas just built a small hydroelectric plant in a nearby river using the latest innovative renewable energy technology. The dam is connected to the local power supply. Sometimes, the needs of the community are exceeded and excess power is sold to the company Kansas's power grid. Which of the following is not an externality associated with Selma's new hydroelectric dam?
- The decrease in air pollution associated with decreased dependence on fossil fuel energy
 - The endangerment of a species of fish that previously occupied the area of the hydroelectric dam
 - The profits the city of Selma makes from its sale of excess power**
 - The increase in tourism stemming from the attraction of the sophisticated hydroelectric dam
20. The "Miracle of Aggregation" of voting, whereby a population of 99% uninformed and 1% informed voters will still vote for the same outcome as a 100% informed population, is a common argument used to defend democratic voting on economic issues. Which of the following is a valid counterargument to the Miracle of Aggregation?
- The "miracle of aggregation" model assumes that uninformed voters make random errors. This, in fact, is not true: behavioral economics shows that uninformed voters make predictable, systemic errors guided by biases.**
 - The voting population of most countries is not sufficiently large to ensure that this law of large numbers is true. Voting populations of countries are small enough that random statistical variations can produce results that deviate from those predicted by this theory.
 - The voting populations of most modern countries already have a very high percentage of informed voters, so this is a superfluous means of explaining a well-understood phenomenon.
 - This model assumes that the transfer of information takes time, but with today's technology and Internet access, most information is communicated almost immediately.
21. One week, a firm receives \$9,000 from its customers. It must pay \$1,000 in taxes on products and \$500 in taxes on production. It receives \$100 in subsidies on products and \$50 in other subsidies. Which of the following is equal to \$7,650?
- The value of its products sold at market prices
 - The value of its products sold at basic prices

- c. **The value of its products sold at factor cost**
 - d. None of the above
22. Which of the following statements about people who rent out land for animals to graze on is true?
- a. The whole income of these people is economic rent because land as a whole is in perfectly inelastic supply.
 - b. The whole income of these people is transfer earnings, because if the rent was any lower they would not bother to rent out their land.
 - c. **The income of these people is divided between economic rent and transfer earnings, and some people have higher transfer earnings and lower economic rent than others.**
 - d. The income of these people is divided between economic rent and transfer earnings, and the proportion of this income which is economic rent is the same for all of them.
23. Which of the following best characterizes Marshallian demand?
- a. Maximize expenditure to deliver a fixed level of utility
 - b. Minimize expenditure to deliver a fixed level of utility
 - c. **Maximize utility for a fixed level of wealth**
 - d. Minimize utility for a fixed level of wealth
24. The contract curve of an Edgeworth box is:
- a. **A set of points on the Pareto set**
 - b. A set of points in the Edgeworth box but not on the Pareto set
 - c. A set of points not in the Edgeworth box and not on the Pareto set
 - d. A single point in the Edgeworth box
25. Assume that the market for fast food workers is in equilibrium at a wage of \$9.50. Congress passes a law imposing a minimum wage of \$10.00 per hour in the fast food labor market. What is the effect of this change on that labor market?
- a. The labor demand curve will shift to the left.
 - b. **The quantity of labor demanded will fall.**
 - c. Unemployment will increase by the decrease in quantity of labor demanded.
 - d. Unemployment will increase by the increase in the quantity of labor supplied.
26. Which country would you expect to have the highest Gini Coefficient?
- a. Iceland
 - b. United Kingdom
 - c. **Mexico**
 - d. Sweden
27. What is the definition of a Veblen good?
- a. **When the price increases, demand increases**
 - b. When the price increases, demand decreases
 - c. When demand increases, price increases
 - d. When demand increases, price decreases

Form A

28. Which of the following is the best investment to make, assuming you are willing to spend \$1000? Assume all opportunities represent points along the same 2-dimensional indifference curve.
- a. A 10-year municipal bond that costs \$1000
 - b. Ten shares of Apple stock costing \$100 each
 - c. \$1000 for a 5% stake in your friend's start-up cryptocurrency exchange platform
 - d. Answer cannot be determined from the given information**
29. Angelina is planning for her retirement and has standard indifference curves for consumption today and consumption tomorrow. When the substitution effect outweighs the income effect, an increase in the interest rate will:
- a. Increase the amount she saves**
 - b. Decrease the amount she saves
 - c. Leave her savings unchanged
 - d. Any of the above is possible
30. Which of the following statements is true:
- a. At every point on an indifference curve $MRS = MU_x/MU_y$**
 - b. At every point on a budget constraint $MRS = MU_x/MU_y$
 - c. At every point on an indifference curve $MRS = P_x/P_y$
 - d. At every point on a budget constraint $MRS = P_x/P_y$

Part II: Macroeconomics

31. Suppose the Bureau of Labor Statistics forecasts inflation. Consequently, the Federal Reserve, concerned about inflation, seeks to raise interest rates. Which of the following choices would not have the desired effect?
- Increase the Federal Funds Rate
 - Sell its holdings of US Treasury notes to one of its member banks
 - Quantitative easing**
 - Increase the reserve requirement
32. According to economist Thomas Sowell, a government regulation which mandates child safety seats on commercial airplanes would be more likely to actually increase the number of lives lost if
- the cross-elasticity of automobile travel with respect to the price of airline fares is relatively large**
 - airline travel is an inferior good
 - airline travel is a normal good
 - the own-price elasticity for automobile travel is unit elastic
33. Unlike the GDP deflator, the CPI includes the prices of:
- Goods purchased by firms
 - Goods purchased by the government
 - Exported goods
 - Imported goods**
34. The country of HPEC can reduce its trade deficit in the long run by
- Imposing import tariffs
 - Providing export subsidies
 - Providing saving incentives to citizens
 - Providing investment incentives to citizens
- I or II
 - III**
 - IV
 - I, II, III or IV
35. As the substitutability of HPEC assets and other countries' assets rises, a given increase in government spending in HPEC will lead to a _____ increase in interest rates and _____ crowding-out of domestic investment.
- Greater; more
 - Greater; less
 - Smaller; more
 - Smaller; less**
36. If there is a general decline in liquidity within the money market in the U.S., then it can be expected that:

Form A

- a. the federal funds rate will rise and the long-term interest rate would rise consequently
 - b. banks will increase their interbank lending
 - c. the federal funds rate will rise and the Federal Reserve will likely increase the supply of liquidity to the banks**
 - d. the federal funds rate will fall
37. When economists use the Paasche index to determine consumer price index (CPI), one defining aspect of the resulting CPI is that
- a. the general price level is overestimated
 - b. the general price level is underestimated**
 - c. item substitution bias has been removed
 - d. none of the above
38. The price of a Treasury bond has fallen. This could be because:
- a. A year has passed since its issuance, so its maturity date is a year closer.
 - b. The Treasury has paid some of its outstanding debt.
 - c. Congress has passed a budget that increases the size of the deficit.**
 - d. All of the above could explain the fall in the price of the treasury.

Questions 39 – 40 refer to the CLOSED economy of Madagascar in which saving and investment are as follows:

$$I = 2000 - 200 * r$$
$$S = 200 * r$$

Where r is in percentage points (i.e. if $r = 2$, that means 2%) and saving and investment are in thousands of dollars.

39. The equilibrium interest rate, level of investment is:
- a. 2%, \$500
 - b. 4% \$750
 - c. 5%, \$1000**
 - d. 10%, \$2000
40. It is a year later, and you notice that now, in Madagascar, saving and investment are as follows: $I = 2400 - 200 * r$ and $S = 200 * r - 200$. What combination of policies could explain the change in the investment and saving functions?
- a. An investment tax credit that reduces public saving**
 - b. A saving incentive that reduces public saving
 - c. A reduction in the budget deficit that increases investor confidence
 - d. An increase in the budget deficit that reduces investor confidence
41. Which of the following equations represents a variable X that behaves like a random walk? (the subscripts represent time, “ a ” is a constant, and “ σ ” is noise).
- a. $\Delta X_t = \Delta X_{t-1}$
 - b. $X_t = X_{t-1} + \sigma_t$**
 - c. $X_t = \sigma_t$
 - d. $X_t = \sigma_{t-1} + \sigma_t$

42. Following the November midterm elections, the Financial Times reported that Wall Street's principal metric for the implied volatility of the S&P 500 Index had dropped to its lowest level in three weeks, an indication that investors expected the results of the midterm elections. What is meant by the implied volatility of the S&P 500 index? Volatility of...
- the S&P 500 index relative to real-time global markets.
 - the S&P 500 index, as determined from historical price levels.
 - the S&P 500 index which is classified as a backward-looking measure of volatility after using the Black-Scholes Option Pricing formula.
 - the S&P 500 index which is classified as a forward-looking measure of volatility after using the Black-Scholes Option Pricing formula.**
43. Someone can raise the normative argument that maximizing social surplus may have a negative effect on society because
- there is often too much surplus
 - surplus maximization is inefficient
 - surplus does not equate willingness to pay
 - surplus may be distributed unfairly, even if it is Pareto efficient**
44. The Solow growth model is based on the assumption that:
- savings, population growth, and technological change affect output over time**
 - output is determined at a point in time
 - output is determined with fixed amounts of capital and labor, and so coheres with a Leontief production function
 - there is a static allocation, production, and distribution of the economy's output
45. A time-inconsistency problem within macroeconomic policy can arise when the policymaker:
- has no discretion
 - has discretion to act their best in a situation, based on their own experience**
 - has discretion in the short run but follows a general principle in the long run
 - is made to follow a strict and inflexible rule
46. Scholars on Middle East politics and policy, such as Harvard University's Professor Tarek Masoud, have studied several repercussions of the U.S.-led coalition against Iraq in 2003. One such effect was the eradication of Iraq's capital stock. In the long-run, economists would likely predict that Iraq's capital-labor ratio would:
- decrease because of a leftward shift in the savings per capita curve
 - see no change**
 - increase because of a rightward shift in the savings per capita curve
 - increase because of a rightward movement in the savings per capita curve
47. Assume Boeing purchases one "Black Box" from a separate company, Company B, for \$60,000 and a jet engine from a separate company, Company J, for \$20 million, and that Boeing puts all of these items in/on a plane that it sells for \$87 million. Therefore, the amount of money that should ultimately be counted in GDP is:
- \$87 million**
 - \$107,060,000 million
 - \$87 million minus Company B and Company J's costs
 - \$107,060,000 million minus the costs of all three companies

48. Which of the following raises GDP in 2019?
- The December 2019 purchase of a Tudor home that was built in 1943.
 - Imputed value, determined February 2019, of an owner-occupied house built 1977.**
 - A firm's sale of a good that had been in inventory since 2017.
 - None of the above.
49. Which of the following are both part of the U.S. Federal Reserve's Dual Mandate?
- Stabilizing the inflation rate and stabilizing the unemployment rate at a level that is consistent with maximum sustainable employment**
 - Stabilizing the inflation rate and stabilizing the U.S. dollar's exchange rate
 - Stabilizing the unemployment rate at a level that is consistent with maximum sustainable employment and stabilizing the U.S. dollar's exchange rate
 - All three ideas are part of the Fed's dual mandate
50. What is the biggest factor in the fact that the U.S. grew faster than the world economy from 1995-2000?
- Investment in IT capital**
 - Improvements in quality of labor
 - Improvements in the quantity of labor
 - The stock market boom
51. Which of the following was not one component of the three arrows of Japanese Abecomics as of 2012?
- Quantitative easing to end deflation
 - Government purchases to stimulate economy
 - Increased regulation of trade**
 - Labor market reforms
52. Suppose an economy is in a long-run equilibrium characterized as some steady state of a “saving trap” model. A plague kills a large share of the labor force L , but does not harm the physical capital stock K . Also, the population growth rate immediately before and just after the plague remains at n , so the plague generates a one-time drop in the level of the labor force L but no change in its growth rate. Which of the following may occur in response to this plague?
- An immediate increase in the level of output per worker Y/L
 - A permanent increase in the level of output per worker Y/L
 - A permanent reduction in k^* (relative to the pre-plague k^*) towards the zero-output equilibrium, which is a stable steady state.
 - A and B only**
53. Consider an economy that is in steady state and that is described by the Solow Model. The rate of growth of technological progress is g is 0.02, the depreciation rate δ is 0.02 and the population growth rate n is negative, at $n = -0.02$. The savings rate s is 0.10. The value of α in the production function is 0.50. What is the steady-state value of capital per effective unit of labor k^* ?
- 25**
 - 2.78

Form A

- c. 15
 - d. 6.25
 - e. 0.25
54. In the Keynesian Cross diagram, if the consumption function is given by $C = 100 + 0.6(Y - T)$, planned investment I is 100, G is 100, and T is 100, then equilibrium output Y is:
- a. 300
 - b. 400
 - c. 600**
 - d. 750
55. Over the next 30 years, which of the following (relative to GDP) is expected to contribute to changes in the federal deficit?
- a. Decrease in healthcare spending
 - b. Decrease in income tax revenues
 - c. Increase in net interest**
 - d. Decrease in net interest
56. Assume that taxes T have decreased. Before this change, the economy was at the long-run level of output Y . In the short run, under the standard assumptions for the IS and LM curves, this change would be expected to the real interest rate r and output Y .
- a. raise; raise**
 - b. raise; reduce
 - c. reduce; raise
 - d. reduce; reduce
57. Which of the following is a major weakness of the gold standard?
- a. It does not allow for discretionary fiscal policy
 - b. It does not allow for monetary policy**
 - c. It hindered trade between countries
 - d. It boosted trade between monopolistic countries
58. After a country goes from disallowing trade in coffee with other countries to allowing trade in coffee with other countries,
- a. the domestic price of coffee will be greater than the world price of coffee
 - b. the domestic price of coffee will be lower than the world price of coffee
 - c. the domestic price of coffee will equal the world price of coffee**
 - d. the world price of coffee does not matter; the domestic price of coffee prevails
59. Which of the following is false about the Standard and Poor's 500 index?
- a. The index is weighted based on market caps of its constituent companies.
 - b. The index tracks the value of the 500 highest price-per-share companies traded on the New York Stock Exchange.**
 - c. The index has had a positive average correlation coefficient with the DJIA over the past 15 years.
 - d. The index is less sensitive to changes in price of individual companies than the DJIA is.
60. During a period of high volatility, investors expect to experience which of the following?

Form A

- a. **A high degree of fluctuation in the prices of stocks on the stock market**
- b. A drop in share prices of small-cap and an increase in share prices of large-cap companies
- c. A precipitous drop in trade volumes
- d. Decrease in lower-risk (bond) trading and increase in higher-risk (stock) trading