

Name: _____

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Principles of Microeconomics — Practice Exam

Instructions: Part A: answer ALL 30 multiple-choice questions (2 points each). Each question has four options, A to D, of which exactly one is correct. Part B: answer ALL 4 questions (10 points each) and show your working. A calculator may be used. Time allowed: 90 minutes.

Time Limit: 90 minutes

Multiple Choice (30 questions)

- [2 points] 1. Maya is deciding whether to spend next year at university or in a job. Tuition and fees would be 9,000 dollars and books 600 dollars. Her rent and food would be 8,000 dollars, the same amount she would spend if she worked instead. The job she would otherwise take pays 24,000 dollars for the year. The opportunity cost of her year at university is:
- A. 9,600 dollars
 - B. 24,000 dollars
 - C. 41,600 dollars
 - D. 33,600 dollars
- [2 points] 2. In one hour Ana can make either 20 sandwiches or 40 coffees, and Ben can make either 10 sandwiches or 30 coffees. Which of the following is correct?
- A. Ana should make both goods, because she has an absolute advantage in both
 - B. Ana should specialise in sandwiches and Ben in coffees, because a sandwich costs Ana 2 coffees but costs Ben 3 coffees
 - C. Ana should specialise in coffees, because 40 coffees is the larger of her two outputs
 - D. Ben should specialise in sandwiches, because his opportunity cost of a sandwich is only one third of a coffee
- [2 points] 3. Which of the following would shift an economy's production possibilities frontier OUTWARD?
- A. A fall in the unemployment rate from 8 percent to 5 percent
 - B. A shift in consumer tastes away from manufactured goods toward services
 - C. An improvement in technology that raises output per worker in every industry
 - D. A decision to produce more consumer goods and fewer capital goods this year

- [2 points]** 4. For which of the following is demand likely to be the MOST price elastic?
- A. Table salt
 - B. Petrol over the next week
 - C. One particular brand of bottled water
 - D. Insulin for a diabetic patient
- [2 points]** 5. The price elasticity of demand for cigarettes is estimated at 0.4 in absolute value. A government wants to cut the quantity of cigarettes smoked by 10 percent by raising their price through a tax. The price must rise by approximately:
- A. 25 percent
 - B. 4 percent
 - C. 10 percent
 - D. 40 percent
- [2 points]** 6. Leo has 12 dollars a week to spend on pizza slices, which cost 3 dollars each, and cans of soda, which cost 1 dollar each. His marginal utility from pizza is 30, 24, 18 and 12 utils for the first to fourth slices, and from soda it is 10, 8, 6, 5, 3 and 1 utils for the first to sixth cans. To maximise total utility, Leo should buy:
- A. 4 slices and no soda, because each slice gives more utility than any can of soda
 - B. 2 slices and 2 cans, because the marginal utility per dollar is then equal at 8 for both goods
 - C. 2 slices and 6 cans
 - D. 3 slices and 3 cans
- [2 points]** 7. A student has 60 dollars a week to spend on canteen meals at 6 dollars each (horizontal axis) and cinema tickets at 12 dollars each (vertical axis). The cinema then cuts its ticket price to 10 dollars, with income and the meal price unchanged. The student's budget line:
- A. shifts outward in a parallel way, because the student can now afford more of both goods
 - B. pivots outward around the meal intercept of 10 meals: the ticket intercept rises from 5 to 6 tickets
 - C. pivots outward around the ticket intercept of 5 tickets: the meal intercept rises from 10 to 12 meals
 - D. does not move, because the student's income is unchanged
- [2 points]** 8. A bakery with a fixed amount of kitchen equipment hires workers by the day. With 0, 1, 2, 3, 4 and 5 workers its daily output is 0, 12, 28, 42, 52 and 58 loaves respectively. The marginal product of the third worker, and the worker with whom diminishing marginal returns set in, are:
- A. 14 loaves; diminishing marginal returns set in with the third worker
 - B. 42 loaves; diminishing marginal returns set in with the fourth worker
 - C. 14 loaves; diminishing marginal returns set in with the fourth worker
 - D. 16 loaves; diminishing marginal returns set in with the second worker

- [2 points]** 9. At a firm's current level of output, marginal cost is below average variable cost. It follows that:
- A. average variable cost is rising
 - B. marginal cost must be falling
 - C. average variable cost is falling
 - D. average total cost is at its minimum
- [2 points]** 10. A firm's total cost is 2,200 dollars when it produces 50 units and 2,236 dollars when it produces 51 units. Its fixed cost is 800 dollars. At 50 units, average variable cost, average total cost and the marginal cost of the 51st unit are:
- A. AVC 28 dollars; ATC 44 dollars; MC 36 dollars
 - B. AVC 44 dollars; ATC 28 dollars; MC 36 dollars
 - C. AVC 28 dollars; ATC 44 dollars; MC 43.84 dollars
 - D. AVC 16 dollars; ATC 44 dollars; MC 36 dollars
- [2 points]** 11. Which of the following statements about the short run and the long run in the theory of the firm is correct?
- A. The short run is any period shorter than one calendar year
 - B. In the long run all inputs are variable, so there are no fixed costs
 - C. In the short run a firm cannot change its output, only its price
 - D. Diminishing marginal returns apply in the long run but not in the short run
- [2 points]** 12. A firm's long-run total cost is 60,000 dollars when it produces 2,000 units a month and 84,000 dollars when it produces 3,500 units a month. Over this range the firm experiences:
- A. diseconomies of scale, because total cost rises by 24,000 dollars
 - B. constant returns to scale, because each of the extra units costs 16 dollars
 - C. diminishing marginal returns, because the marginal cost of the extra units is below average cost
 - D. economies of scale, because long-run average cost falls from 30 dollars to 24 dollars
- [2 points]** 13. A perfectly competitive firm has a fixed cost of 15 dollars. The marginal cost of its first seven units is 8, 11, 14, 17, 20, 23 and 26 dollars respectively. The market price is 18 dollars. The firm's profit-maximising output and its economic profit are:
- A. 3 units; profit 6 dollars
 - B. 5 units; profit 5 dollars
 - C. 4 units; profit 7 dollars
 - D. 4 units; profit 22 dollars
- [2 points]** 14. A perfectly competitive firm is producing the output at which marginal cost equals the market price of 12 dollars. At that output its average total cost is 15 dollars and its average variable cost is 10 dollars. In the short run the firm should:
- A. shut down, because the price does not cover average total cost
 - B. keep producing, because the price covers average variable cost
 - C. raise its price to 15 dollars so that it covers average total cost
 - D. leave the industry immediately, because its economic profit is negative

- [2 points]** 15. A perfectly competitive, constant-cost industry is in long-run equilibrium. Demand for its product then increases permanently. In the new long-run equilibrium, compared with the original one:
- A. the price is higher and industry output is larger, because each firm produces more
 - B. the price is back at its original level and industry output is larger, because new firms have entered
 - C. the price and industry output are both back at their original levels
 - D. the price is lower, because the entry of new firms increases supply by more than demand rose
- [2 points]** 16. In long-run equilibrium a perfectly competitive firm produces where price equals marginal cost and also equals minimum average total cost. Which statement correctly explains why this outcome is efficient?
- A. Price equal to marginal cost gives allocative efficiency; price equal to minimum average total cost gives productive efficiency
 - B. Price equal to marginal cost gives productive efficiency; price equal to minimum average total cost gives allocative efficiency
 - C. Zero economic profit shows that firms are only just covering their explicit costs, so no resources are wasted on profit
 - D. Price equal to marginal cost means that each firm is maximising its total revenue
- [2 points]** 17. A monopolist faces the following demand schedule: at a price of 10 dollars it sells 1 unit; at 9 dollars, 2 units; at 8 dollars, 3 units; at 7 dollars, 4 units; at 6 dollars, 5 units. The marginal revenue of the fourth unit is:
- A. 7 dollars
 - B. 4 dollars
 - C. 28 dollars
 - D. 2 dollars
- [2 points]** 18. A monopolist faces the demand curve $P = 100 - 2Q$, where P is the price in dollars and Q is units per day. Its marginal cost is constant at 20 dollars and it has no fixed costs. Its profit-maximising output, price and daily profit are:
- A. $Q = 20$, $P = 60$, profit 800 dollars
 - B. $Q = 25$, $P = 50$, profit 750 dollars
 - C. $Q = 40$, $P = 20$, profit 0 dollars
 - D. $Q = 20$, $P = 20$, profit 0 dollars
- [2 points]** 19. A water utility is a natural monopoly: its average total cost falls over the entire range of market demand. A regulator orders it to charge a price equal to its marginal cost. As a result the utility will:
- A. earn exactly zero economic profit, which is the regulator's intention
 - B. earn a positive economic profit, because marginal-cost pricing maximises output
 - C. produce the unregulated monopoly output, because marginal-cost pricing changes only the price
 - D. make a loss, because when average total cost is falling, marginal cost lies below it, so the price does not cover average cost

[2 points] 20. A cinema charges students 6 dollars and other adults 12 dollars for the same seat at the same screening. Which of the following is NOT a condition needed for this price discrimination to be profitable?

- A. The cinema has some market power, so that it can set prices rather than take them
- B. The cinema can tell the two groups apart, for example by checking student cards
- C. Tickets cannot be resold by students to other adults
- D. The two groups have the same price elasticity of demand

[2 points] 21. In long-run equilibrium, a firm in monopolistic competition:

- A. earns positive economic profit, because its differentiated product gives it a downward-sloping demand curve
- B. produces at minimum average total cost, exactly like a perfectly competitive firm
- C. earns zero economic profit and produces where price equals average total cost but exceeds marginal cost, with excess capacity
- D. sets price equal to marginal cost, because entry has eliminated its market power

[2 points] 22. Two airlines, Nimbus and Stratus, are the only carriers on a route. Each decides at the same time whether to add summer flights (Expand) or keep its schedule (Hold). Annual profits in millions of dollars, Nimbus first, are: both Hold, 8 and 8; Nimbus Expands while Stratus Holds, 11 and 4; Nimbus Holds while Stratus Expands, 5 and 10; both Expand, 6 and 3. Which of the following is correct?

- A. Expand is a dominant strategy for Nimbus, Stratus has no dominant strategy, and the Nash equilibrium is Nimbus Expand, Stratus Hold
- B. Expand is a dominant strategy for both airlines, so both expand and earn 6 and 3
- C. Both airlines hold, because 8 and 8 is the outcome with the highest combined profit
- D. Hold is a dominant strategy for Stratus, so the Nash equilibrium is both airlines holding

[2 points] 23. An industry has four firms with market shares of 50, 30, 15 and 5 percent. The Herfindahl-Hirschman Index (HHI) for the industry is:

- A. 100
- B. 3,650
- C. 10,000
- D. 2,500

[2 points] 24. A firm sells its output in a competitive market at 5 dollars a unit and hires workers in a competitive labour market at a wage of 45 dollars a day. Its daily output with 1, 2, 3, 4 and 5 workers is 20, 36, 48, 56 and 60 units. To maximise profit it should hire:

- A. 3 workers
- B. 4 workers
- C. 5 workers
- D. 2 workers

- [2 points]** 25. A single hospital is the only employer of nurses in a remote town. Compared with the outcome in a competitive labour market, this monopsonist will:
- A. hire fewer nurses but pay a higher wage, to retain the ones it has
 - B. hire more nurses at a lower wage, because it faces no competition for them
 - C. hire fewer nurses and pay a lower wage, because the marginal cost of an extra nurse exceeds the wage it pays
 - D. hire the same number of nurses but pay a lower wage
- [2 points]** 26. The market for flu vaccinations has demand (marginal private benefit) $P = 80 - 2Q$ and supply (marginal cost) $P = 20 + Q$, where P is in dollars and Q is in thousands of vaccinations. Each vaccination also gives an external benefit of 30 dollars to other people, who become less likely to catch the flu. The market quantity, the socially efficient quantity and the corrective subsidy that would achieve it are:
- A. 20 thousand; 30 thousand; a subsidy of 30 dollars per vaccination
 - B. 20 thousand; 30 thousand; a subsidy of 10 dollars per vaccination
 - C. 30 thousand; 20 thousand; a subsidy of 30 dollars per vaccination
 - D. 20 thousand; 30 thousand; a tax of 30 dollars per vaccination
- [2 points]** 27. Three neighbours value a street light on their shared lane at 50, 30 and 20 dollars a month respectively. The light costs 80 dollars a month to run, and once it is on, nobody on the lane can be excluded from its light. Which of the following is correct?
- A. The light should not be provided, because no single neighbour values it at 80 dollars or more
 - B. The light will be provided by the market, because the neighbours' combined valuation exceeds its cost
 - C. The neighbour who values it at 50 dollars will pay for it, because the other two will contribute the remaining 30 dollars
 - D. The light is worth providing, but because of free riding the market is likely to under-provide it
- [2 points]** 28. Which of the following is the best example of a COMMON RESOURCE?
- A. National defence
 - B. A subscription television channel
 - C. Fish in the open ocean
 - D. A loaf of bread
- [2 points]** 29. After buying comprehensive insurance for her car, a driver starts leaving it on the street overnight instead of in the locked garage she used before. This is an example of:
- A. adverse selection
 - B. moral hazard
 - C. the free-rider problem
 - D. a negative externality

[2 points] 30. In a country's Lorenz curve diagram, with both axes running from 0 to 1, the area between the line of perfect equality and the Lorenz curve is 0.18. The Gini coefficient is:

- A. 0.18
- B. 0.82
- C. 0.64
- D. 0.36

Short Answer (4 questions)

[10 points] 31. Costs and the competitive firm. Orchard Press is a small, perfectly competitive printing firm. Its fixed cost is 40 dollars a day. Its total variable cost at daily outputs of 1, 2, 3, 4, 5 and 6 batches of posters is 18, 32, 49, 68, 96 and 130 dollars respectively.

[3 points] (a) Calculate marginal cost, average variable cost and average total cost at each output from 1 to 6 batches. Give averages to two decimal places where necessary.

[2 points] (b) At which output do diminishing marginal returns set in? At which outputs are average variable cost and average total cost at their minimum, and what is the relationship between marginal cost and each average at those points?

- [3 points]** (c) The market price is 30 dollars a batch. How many batches should Orchard Press produce each day, and what is its daily economic profit? Show your working.

- [2 points]** (d) The price falls to 20 dollars a batch. Should the firm produce in the short run, and if so how much? If market demand stays at its new, lower level, what will happen to the number of firms in the industry and to the price in the long run?

- [10 points]** 32. Monopoly. Harbour Tours is the only company running boat trips in a resort town. The daily demand for trips is: at a price of 60 dollars, no trips are bought; at 55 dollars, 50 trips; at 50 dollars, 100; at 45 dollars, 150; at 40 dollars, 200; at 35 dollars, 250; at 30 dollars, 300; at 25 dollars, 350; at 20 dollars, 400. (The demand curve is $P = 60 - 0.1Q$.) The marginal cost of a trip is constant at 20 dollars and the company has a fixed cost of 2,000 dollars a day.

- [3 points]** (a) Calculate total revenue at each quantity and the marginal revenue per trip of each successive block of 50 trips. Explain why marginal revenue is below price for every block after the first.

- [3 points]** (b) Find the profit-maximising number of trips and the price, and calculate daily profit.

- [2 points]** (c) If the market were perfectly competitive with the same marginal cost, how many trips would be sold? Calculate the deadweight loss caused by the monopoly.

- [2 points]** (d) Suppose Harbour Tours could perfectly price discriminate, charging every customer the maximum he or she is willing to pay. How many trips would it sell, what would happen to consumer surplus and deadweight loss, and what would its daily profit be?

- [10 points]** 33. Oligopoly and game theory. Two firms, Kestrel and Lark, are the only producers of an industrial chemical. Market demand is $P = 130 - Q$, where Q is total output in tonnes a day and P is the price in dollars per tonne. Each firm has a constant marginal cost of 10 dollars a tonne and no fixed costs. Each firm chooses, at the same time and without knowing the other's choice, to produce either 30 tonnes or 40 tonnes a day.

- [3 points]** (a) Build the payoff matrix: calculate the market price and each firm's daily profit for all four combinations of output choices.

- [3 points]** (b) Identify each firm's dominant strategy, if it has one, and the Nash equilibrium. Is the equilibrium the best outcome for the firms?

[2 points] (c) Show that 30 tonnes each is the output a cartel maximising joint profit would choose, and explain why the cartel is likely to break down.

[2 points] (d) Compare the Nash equilibrium with the perfectly competitive outcome for this market, and explain how repeated interaction might change the firms' behaviour.

[10 points] 34. Externalities. The market for paper has demand (marginal private benefit) $P = 120 - 2Q$ and supply (marginal private cost) $P = 20 + 2Q$, where P is dollars per tonne and Q is thousands of tonnes a year. Each tonne of paper produced discharges waste into a river that imposes a cost of 20 dollars per tonne on fisheries downstream. There are no external benefits.

[2 points] (a) Find the unregulated market equilibrium quantity and price.

[3 points] (b) Write down the marginal social cost curve and find the socially efficient quantity and the price that would accompany it. Explain in one or two sentences why the market produces too much paper.

[3 points] (c) What per-unit tax on paper producers would bring about the efficient quantity? Calculate the price buyers pay, the price producers keep after tax, and the government's tax revenue.

[2 points] (d) Calculate the deadweight loss of the unregulated market. Under what conditions could the paper producers and the fisheries reach the efficient outcome by themselves, without a tax?