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BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
FIRST SEMESTER 2016-2017
Comprehensive Examination
PART A (Closed Book)

Course No.	: ECON F211	Max. Marks	: 20
Course Title	: Principles of Economics	Duration	: 90 minutes
Date	: 01 / 12 / 2016 (FN)	Weightage	: 20%

(Multiple Choice Question)

Note:

- **There are 20 multiple choice questions.**
- **Encircle the correct option as A, B, C, D or E.**
- **Each correct answer carries 0.5 marks.**
- **Each wrong answer carries appropriate negative mark.**

Q1. Suppose that market demand for a good slopes downward and market supply slopes upward. Equilibrium price is now \$10 and 500,000 units of the good are traded at this price. Suppose now that the cost at which each unit of the good is produced falls. What is the likely effect of this change on the market equilibrium?

- A) Excess supply.
- B) A fall in price.
- C) A shift in demand to the right.
- D) An increase in price.

Q2. Identify the truthfulness of the following statements.

- I. Diminishing marginal utility and increasing total utility are incompatible with each other.
- II. When marginal utility is negative, total utility is decreasing.
- A) Both I and II are true.
- B) Both I and II are false.
- C) I is true; II is false.
- D) I is false; II is true.

Q3. Suppose the price of *A* is \$20 and the price of *B* is \$10 and that good *A* is plotted on the horizontal axis. If the price of *A* doubles and the price of *B* triples, leaving the consumer's income unchanged, the budget line

- A) will become steeper.
- B) will become flatter.
- C) will shift in toward the origin.
- D) will shift out from the origin.

Q4. The type of elasticity of demand that is most commonly positively valued but that can be negative at times is called

- A) income elasticity of demand and it is negative when the good is a normal good.
- B) income elasticity of demand and it is negative when the good is an inferior good.
- C) price elasticity of demand and it is negative when the slope of the demand curve is negatively sloped.
- D) None of the above.

- Q5.** Suppose when the consumer's income rises by 100%, the consumer's consumption of good X only increases by 1%. We can infer that the consumer's income elasticity for good X is
- A) -0.01
 - B) -1
 - C) 0.01
 - D) 1
- Q6.** Given the demand function $Q_X = 5,000 - 250P_X + 120P_Y + .04I$ where $P_Y = \$50.00$ and $I = \$60,000$, at what quantity of good X will marginal revenue equal zero?
- A) 2144
 - B) 3420
 - C) 5500
 - D) 6700
 - E) 7244
- Q7.** Given the demand function $Q_X = 1500 - 100P_X + 75P_Y + 1.5I + .06A$ where $P_Y = \$40.00$, $I = \$2500$, and $A = \$5,000$. When price of good X is increased from $\$60.00$ to $\$75.00$, we know that demand for good X over this range is:
- A) Elastic
 - B) Inelastic
 - C) unitary elastic
 - D) unresponsive to price changes
 - E) none of the above.
- Q8.** If equal increments of one variable input are added while keeping the amounts of all other inputs fixed, and increasing additions to total product occur, then:
- A) diminishing marginal returns have begun.
 - B) the output level where marginal product is maximized has not yet been reached.
 - C) average product has reached its maximum.
 - D) average product is at its minimum.
 - E) average product is declining.
- Q9.** Given the following data for a perfectly competitive firm, what is the amount of profit the firm will make at the profit maximizing output? $AR = \$100$ and $TC = 1,000 + 125Q - .5Q^2$ where $Q =$ units produced per month
- A) none – the firm would shut down
 - B) $\$1,312.50$
 - C) $\$2,548.63$
 - D) $-\$1,425.86$
 - E) $-\$2,351.27$
- Q10.** A cartel exists when:
- A) a number of firms get together and agree on a policy of managing operations in a way that will maximize the joint profits of the group.
 - B) a number of firms get together and agree on a policy of managing operations in a way that will maximize the profits of the dominant member of the group.
 - C) a group of firms have joined together to make agreements on pricing but not on market strategy.
 - D) a group of firms have joined together to make agreements on market strategy but not on pricing.
 - E) a number of firms get together and agree on a policy of managing operations in a way that will maximize the profits of the largest four of five members of the group.

Q11. When a firm is practicing price discrimination in two markets, the profit maximizing condition is met at:

- A) $MR_F = MC_F + MC_T$
- B) $MR_F = MC_F - MC_T$
- C) $MR_A = MR_B = SMC$.
- D) $MR_A + MR_B = SMC$.
- E) $MR_A - MR_B = SMC$.

Q12. A firm's long-run average cost curve is comprised of

- A) the minimum points of each of the firm's short-run average cost curves.
- B) the lower envelope of the firm's short-run average cost curves.
- C) the minimum points of each of the firm's short-run marginal cost curves.
- D) the series of points where the short-run marginal cost curves intersect the short-run average cost curves.

Q13. Identify the truthfulness of the following statements.

- I. When marginal cost is rising, average total cost is rising.
 - II. When marginal cost is below average total cost, average total cost is falling.
- A) Both I and II are true.
 - B) Both I and II are false.
 - C) I is true; II is false.
 - D) I is false; II is true.

Q14. Identify the truthfulness of the following statements.

- I. A firm can earn a positive accounting profit but a negative economic profit.
 - II. Opportunity cost is included in the definition of economic profit but not in the definition of accounting profit.
- A) Both I and II are true.
 - B) Both I and II are false.
 - C) I is true; II is false.
 - D) I is false; II is true.

Q15. Suppose Joe starts his own business. In the first year the business earns \$100,000 in revenue and incurs \$85,000 in explicit costs. In addition, Joe has a standing offer to come work for his brother for \$40,000 per year. Joe's accounting profit is _____ and Joe's economic profit is _____.

- A) -\$25,000 and \$15,000
- B) \$15,000 and \$65,000
- C) \$15,000 and \$60,000
- D) \$15,000 and -\$25,000

Q16. A decreasing-cost industry is characterized by

- A) more firms than an increasing-cost industry.
- B) some type of economies of scale.
- C) accounting profit net of the minimum return on invested capital demanded by the firm's investors.
- D) some type of diseconomies of scale.

Q17. Suppose that a firm faces a demand curve for its product of $P=10-Q^d$. The firm has a constant marginal cost of \$4 per unit. If the firm engages in first-degree price discrimination, how much producer surplus will it capture?

- A) \$21.
- B) \$18.
- C) \$9.
- D) \$4.50

Q18. In the Cournot model of oligopoly,

- A) each firm chooses simultaneously and non-cooperatively how much to produce to maximize its own profit.
- B) each firm chooses simultaneously and non-cooperatively its own product's price to maximize its own profit.
- C) one firm acts as a quantity leader, choosing its quantity first, while all other firms act as followers, choosing their quantities second and in reaction to the first.
- D) each firm makes its profit-maximizing decision while considering the entire market demand, the same as a monopolist.

Q19. Suppose the market demand curve is given by $P=100-2Q$. If one Cournot duopolist produces $Q=10$, the residual demand curve faced by the other Cournot duopolist is

- A) $P = 90 - 2Q_2$.
- B) $P = 80 - 2Q_2$.
- C) $Q_2 = 80 - P$.
- D) $Q_2 = 80 - 2P$.

Q20. The prisoners' dilemma shows that in a Nash equilibrium

- A) neither player can have a better result than the other.
- B) sometimes players do not reach the optimal outcome.
- C) only an irrational strategy will lead to an outcome worse than the optimal outcome.
- D) each player acting independently will lead to the optimal outcome.

Short Answer Type Question (10 marks)

Instructions:

- Write the answer inside the box provided below each question.
- **Answers written outside the box shall not be evaluated**

Q1. The marketing department of a firm that manufactures small vehicles has determined the following demand function for their cars. $Q_V = 2,00,000 - 50P_V + 75 P_C + 0.4 I + 0.2A$.

If $P_V = \$10,000$, $P_C = \$8,000$, $I = \$25,000$, and $A = \$300,000$, then answer the following question:

- a) Identify the type of elasticity based on calculated values. If the firm increases price, what will happen to total revenue?
- b) Determine the value of income elasticity and cross price elasticity of demand between the two vehicles.

Q2. Suppose The AB Company, Inc has the following total product function, where Q is output per time period and L is the number of units of labor hired: $Q = 1200L + 3L^2 - 0.02L^3$
What will be the numerical value of output and AP_L when the firm reaches the point of diminishing marginal returns to L?

Q3. Suppose that a firm has the following marginal cost function and fixed cost: $73 - 3Q + 0.03Q^2$. Find the value of SMC and AVC when AVC is at its minimum

Q4. A firm has the following total revenue and total cost functions: $TR = 86Q - 0.5Q^2$

$$TC = \frac{1}{3}Q^3 - 4.5Q^2 + 2Q + 10$$

- a) At what level of output does the firm maximize total revenue and total profit respectively?
- b) What is the amount of firm's profit?

Q5. For each of the following, note whether the statement is an example of positive economic analysis or an example of normative economic analysis:

- a) If the government reduces the tax on tobacco, more individuals will start smoking.
- b) The government should lower taxes because tax rates are too high for the average Indian family.
- c) Wealthy senior citizens can afford to buy their own health insurance and therefore should not be given Medicare coverage.
- d) If the price of apples increases, people will buy more bananas.

Q6. Suppose that the total product of labor (per day) for a firm is given by:

$$TP_L = 88LK - 7.5KL^2$$

If the capital is held constant at 1 How many workers should the firm employ if the price of labor and capital is \$156.00 and the price of good is \$12.00?

Q7. A firm's production function is given by $Q = KL$. The wage rate of labor is \$10 and the rental rate of capital is \$20. The firm wants to produce 1,800 units of output. What is the most efficient combination of labor and capital (L, K)?

Q8. If the demand curve of a firm is given as $Q = 50 - (1/6)P$, while the marginal cost is given as $3Q$. What is the maximum profit/ loss the firm can earn in this market.

Q9. Assume consumption is represented by the following: $C = 200 + .75Y$. Also assume that planned investment (I) equals 300. Given the information, calculate the level of consumption and saving that occurs at the equilibrium level of income.

Q10. A monopolist has constant marginal cost of 80 and faces a demand curve $Q = 100 - 0.25Q$. If this monopolist changes from a policy of uniform pricing to a policy of first-degree price discrimination, by how much will its social cost change(indicate increase / decrease in amount)?

*****END*****

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PART B (Open Book)

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Course Title : Principles of Economics	Duration : 90 minutes
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Instructions: All the parts of a question should be answered together and sequentially.

Q1. Suppose Joy enterprise is a competitive firm selling packets of flavored milk. It is operating under following conditions: The price of the flavored milk is Rs.10 per packet and the profit maximizing level of output is one lakh packets per year. Suppose the enterprise has used its own fund of Rs.10 lakhs to construct the plant for processing flavored milk. The market interest rate available at comparable risk is 10% per annum. The enterprise pays Rs. 6,000 as rent per annum and incurs a wage bill of Rs.20, 000 per month. The enterprise also pays Rs. 4,000 as insurance contract per annum. In addition, the material cost is Rs.30, 000 per month. The enterprise runs its operation throughout the year. Given this information, now answer the following question. **[3.00]**

- (a) Calculate the amount of economic profit/loss of the Joy enterprise per annum.
- (b) Assume that due to competition, the market price of flavoured milk have been changed to Rs.7 per packet. Now, should Joy enterprise shutdown its operation? Why or why not? Explain it with detailed calculations.

Q2. A monopolist can produce at a constant average cost of $AC = Rs.5$. It faces a market demand curve given by

$$Q = 53 - P.$$

[3.00]

- (a) Calculate the amount of profit earned by the monopolist.
- (b) Suppose a second firm enters the market. Let Q_1 be the output of the first firm and Q_2 be the output of the second firm. And let $Q = Q_1 + Q_2$. Assume that the second firm has the identical costs as the first firm. Calculate the amount of profits of each firm?
- (c) Assume the firms were operating under perfectly competitive market; calculate the profit-maximizing price and the amount of profit.

Q3. Suppose a manufacturing firm has demand functions in three sub-markets which are given as follows: **[3.00]**

$$Q_1 = 1575 - 0.25P_1$$

$$Q_2 = 21 - 0.2P_2$$

$$Q_3 = 125 - \frac{1}{6}P_3$$

The total cost function is $TC = 20 + 5Q$, where $Q = Q_1 + Q_2 + Q_3$

- (a) Calculate the amount of profit, if the firm follows the policy of price discrimination.
- (b) Calculate the amount of profit if the firm follows the policy of no price discrimination. (**Note: Do not round up your answers and answers should be in up to 2 decimals**)

Q4. Two major networks are competing for viewer ratings in the 8:00-9:00 PM and 9:00-10:00 PM slots on a given weeknight. Each can choose to put its “bigger” show first or to place it second in the 9:00–10:00 PM slot. The combination of decisions leads to the following “ratings points” results in terms of payoff:

[2.00]

		Network 2	
		First	Second
Network 1	First	18	20
	Second	4	16

- (a) Find the **Nash equilibrium** for this game. (**NOTE: No detailed explanation is required; only mention the equilibrium point with strategy name for each network and the corresponding value of payoff for each network**).
- (b) If each network uses a **Maximin** strategy, what will be the resulting equilibrium? (**Note: No detailed explanation is required** mention only the equilibrium point with **strategy name for each network** and the **corresponding values of payoff**).

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Q5. Royal Blue Construction Co. is about to sell some used equipment to ABC Leasing. ABC has offered the following two payment schemes:

- (a) \$50,000 right now and \$200,000 at the end of seven years.
 (b) \$50,000 right now, \$50,000 at the end of two years, \$50,000 at the end of five years, and \$150,000 at the end of ten years.

If the applicable discount rate for either transaction is 8%, which would be the better alternative currently for Royal Blue Construction and why?

[3.00]

Q6. Suppose the level of autonomous investment in an economy is 200 crores. The following is the aggregate saving function of the economy which is given: $S = -80 + 0.25 Y$.

[1.00]

- (a) Find the level of consumption and saving at the equilibrium level.
 (b) If investment is increased by 20% of its original level, what will be the new level of income, consumption and saving?

Q7.

[2.00]

- (a) How much will be the hike in the investment required to lift the national income by \$5000, if MPC is 0.60.
 (b) How much will there be hike in consumption and saving due to this hike in income?

Q8. A competitive refining industry produces one unit of waste for each unit of refined product. The industry disposes of the waste by releasing it into the atmosphere. The private value for the refined product is $P = 24 - Q$ where Q is the quantity consumed when the price consumers pay is P . The private cost curve for refining is $PC = 2 + Q$ when the industry produces Q units. The external cost curve is $EC = 0.5Q$ when the industry releases Q units of waste.

[3.00]

- (a) What are the equilibrium price and quantity for the refined product when there is no correction for the externality?
 (b) How much of the chemical should the market supply at the social optimum? What is the value of MSC at that level of output?
 (c) Suppose the government imposes an emissions fee of $\$T$ per unit of emissions. How large should the emissions fee be (total tax) if the market is to produce the social efficient amount of the refined product?

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