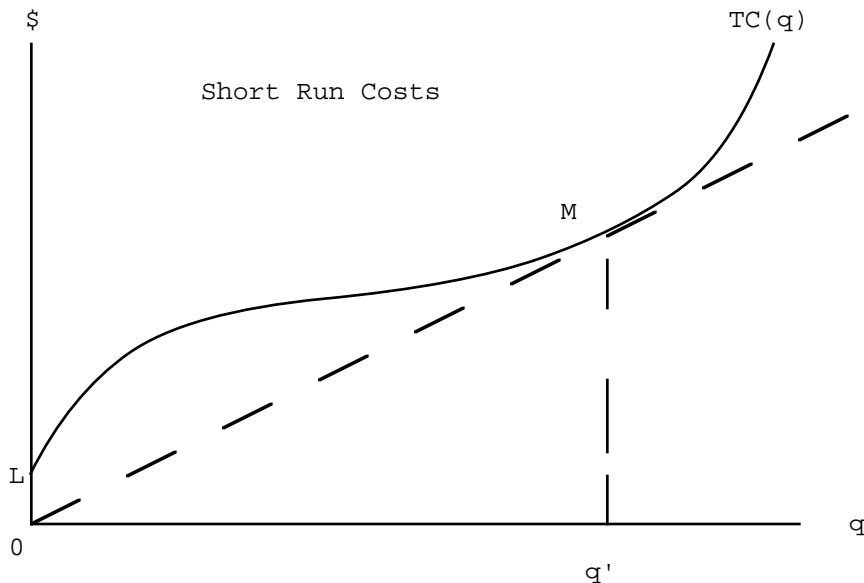


**Midterm 2**

**Part I. Multiple Choice-Concepts and Definitions** (50 points): For each of the following choose the letter that corresponds to the best answer.

1. For two prospects with the same expected value:
  - a) A risk-neutral individual will be indifferent between the two prospects.
  - b) A risk-averse individual will prefer the prospect with the larger spread in the outcomes.
  - c) A risk-inclined individual will prefer the prospect with the smaller spread in the outcomes.
  - d) A risk-averse individual will be indifferent between the two prospects.
  
2. If a risk averse consumer purchases fair insurance then:
  - a) The premium exceeds the expected pay out of coverage.
  - b) The consumer demands less than full coverage.
  - c) The consumer shifts income from the no loss state to the state where loss occurs.
  - d) The consumer increases the risk compared to the case where no insurance is purchased.



3. In the above diagram, a firm producing  $q'$  units of output:
  - a) Is minimizing average variable costs of production.
  - b) Is minimizing average total costs of production.
  - c) Faces fixed costs equal to  $Mq'$ .
  - d) Faces a marginal cost smaller than average total cost of production.
  
4. In the above diagram:
  - a) Total fixed costs decline for increases in output.
  - b) Average total cost at  $q'$  equals  $Mq'$  divided by  $0q'$ .
  - c) Marginal cost is increasing for all values of output.

d) A competitive firm would be making positive economic profits if it found it optimal to operate at output less than  $q'$ .

5. The law of diminishing returns to a variable input:

- a) Assumes that at least one input is held fixed.
- b) Refers to the behavior of the average product of the variable input.
- c) Refers to the economies of scale exhibited by the production function.
- d) Assumes that the firm is operating in the long run.

6. The production function  $F(K,L) = K + 2L + 5$  exhibits:

- a) Increasing returns to scale.
- b) Constant returns to scale.
- c) Decreasing returns to scale.
- d) Diminishing marginal product of labor.

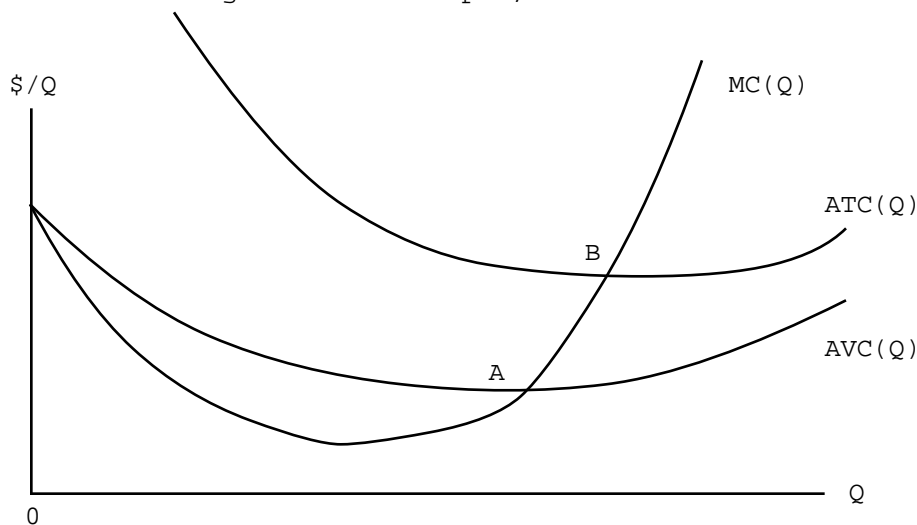
7. Conditional input demand functions give:

- a) The maximum quantities of inputs that can be purchased at various input prices.
- b) The cost-minimizing quantities of inputs, conditional on an output level and input prices.
- c) The combinations of inputs that can be purchased at a particular level of expenditure.
- d) The combinations of inputs that can produce a particular level of output.

8. Suppose a producer minimizes the cost of producing a certain output level with 200 units of labor and 100 units of capital.

- a) The user cost of capital must be twice the wage.
- b) The user cost of capital must be half the wage.
- c) The rate of technical substitution must equal 2.
- d) There is not enough information to determine either the factor price ratio or the rate of technical substitution.

Assume that the following diagram is derived for a firm which operates in the short run with a single variable input, labor.



9. In the diagram:

- a) The average product of labor is at a maximum at point A.

- b) Average fixed cost is constant.
- c) The slope of the AVC equals the slope of the ATC at every output.
- d) The firm must be operating under increasing returns.

10. At point B in the diagram:

- a) The average product of labor is at a maximum.
- b) The slope of the total cost curve is less than the slope of the total variable cost curve at the same output.
- c) The average product of labor is rising.
- d) The marginal product of labor is less than the average product of labor.

**Part II. Problems** (50 points): Do both of the following.

1. Consider a competitive firm for which production takes time. To be more specific, suppose that labor is the sole input used in production. Labor hired in period 1 yields output according to the production function  $f$ , but the output is only available in period 2. Suppose the firm has no cash on hand to pay for the labor it employs in period 1, but instead the firm must borrow from a bank at interest rate  $i$  to pay for its wage bill, using the proceeds from the sale of the product in period 2 to pay off the loan.

- a) Formulate the problem which determines how much labor the firm will hire.
- b) What conditions characterize the firm's optimum, assuming that some production is optimal?
- c) What impact would an increase in the interest rate have on the amount of labor employed? Give an explanation for your answer.

2. Society consists of two types of individuals: healthy ( $h$ ) and sickly ( $s$ ). Suppose 90% of all people are healthy. Suppose healthy people have a 10% chance of becoming seriously ill while sickly people have a 50% chance of becoming seriously ill. Suppose serious illness costs the patient \$1,000. Suppose both types of individuals have identical preferences for income and both types are risk averse. Finally assume insurance markets are perfectly competitive so that in the long run insurance firms make zero expected profits.

A health insurance policy is a contingent claim granting an individual \$1,000 if he becomes seriously ill.

- i) If a single type of health insurance policy is sold, find its long run equilibrium price.
  - a) How does your answer change if you are told that healthy people are willing to pay at most \$120 for such an insurance policy? Will any insurance be sold in this case?
- ii) If health can be determined before sale of insurance policies via medical examination then there will be two prices for health insurance.  $p_h$  is the price healthy people must pay and  $p_s$  is the price sickly people must pay.
  - a) Determine these prices in long run equilibrium.
  - b) What happens to these prices if a medical exam costs \$10 per person?