MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of the following conditions holds in an economically efficient competitive market equilibrium?
   A) The deadweight loss is positive but at a minimum.
   B) Producer and consumer surplus are exactly equal in size.
   C) The marginal benefit of the last unit produced and consumed is maximized.
   D) There are no positive and no negative external effects from consumption and production.

2) Refer to Figure 5-12. One way to obtain the economically efficient amount of college education is for governments to subsidize college education. What is the size of the per-student Pigovian subsidy that the government must provide to internalize the external benefits? (Note that the subsidy can be granted to the education institutions or to the students directly or indirectly; for example, through low-interest student loans.)
   A) $P_1$     B) $P_0 - P_1$     C) $P_2 - P_1$     D) $P_2 - P_0$

College education benefits society by producing a more employable workforce, reducing crime, and creating a better informed citizenry. Thus, the social benefits of college education exceed the private benefits for any level of college education. This is illustrated in Figure 5-12.
Companies producing toilet paper bleach the paper to make it white. The bleach is discharged into rivers and lakes and causes substantial environmental damage. Figure 5-9 illustrates the situation in the toilet paper market.

3) Refer to Figure 5-9. The efficient output is
   A) Q1.  
   B) Q2.  
   C) Q3.  
   D) Q4.  

4) The market demand for a public good can be determined by
   A) estimating the value of the benefit that each unit provides and multiplying that by the number of consumers.
   B) adding up how much each citizen expects to consume at each possible price.
   C) adding up the total private benefits and external benefits that each quantity provides the citizens of a country.
   D) adding up how much each consumer is willing to pay for each unit of the public good.

5) A tragedy of the commons occurs when a resource is
   A) non-rival and excludable.  
   B) rival and non-excludable.  
   C) non-rival and non-excludable.  
   D) rival and excludable.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

6) What is meant by the term "internalizing an externality"? How does a Pigovian tax or subsidy internalize an externality?
Figure 5-2 shows a market with a negative externality.

7) Refer to Figure 5-2. The deadweight loss due to the externality is represented by the area
   A) abd.  B) abc.  C) abf.  D) ade.
Figure 5-15 shows the market for Atlantic salmon, a common resource. The current market equilibrium output of $Q_1$ is not the economically efficient output. The economically efficient output is $Q_2$.

8) Refer to Figure 5-15. The current market equilibrium output is partly the result of overfishing. In that case, what does $S_2$ represent?

   A) the private marginal cost of harvesting salmon  
   B) the private marginal benefit of harvesting salmon  
   C) the social marginal cost of harvesting salmon  
   D) the social marginal benefit of harvesting salmon

9) Alternative approaches for reducing carbon dioxide emissions are

   A) burning low carbon coal and deforestation.  
   B) carbon taxes and carbon trading.  
   C) carbon taxes and carbon scrubbing.  
   D) carbon trading and carbon subsidies.
Chicken pox vaccinations for toddlers benefit society by protecting young children and by preventing an epidemic of the disease. Thus, the social benefits of chicken pox vaccinations exceed the private benefit for any quantity of vaccinations as illustrated in Figure 5-10.

10) Refer to Figure 5-10. What is the value of the net gain to society as a result of subsidizing chicken pox vaccinations?
   A) \((P_E \times Q_E)\)  
   B) value equal to the area of \(FEG\)  
   C) value equal to the area of \(Q_F G Q_E\)  
   D) \((P_F \times Q_F)\)

11) Private costs
   A) are borne by producers of a good while social costs are borne by government.  
   B) are borne by producers of a good while social costs are borne by society at large.  
   C) are borne by producers of a good while social costs are borne by those who cannot afford to purchase the good.  
   D) are borne by consumers of a good while social costs are borne by government.

12) Compare two situations. (A) A firm is not legally responsible for damages that result from air pollution caused by its production of steel. (B) A firm is legally responsible for damages that result from its production of steel. Ronald Coase argued that
   A) bargaining between the firm and the victims of the air pollution caused by the firm will result in little reduction of pollution in either situation (A) or (B) because the firm has greater economic and political power than the victims.  
   B) bargaining between the firm and the victims of the air pollution caused by the firm would lead to a smaller reduction in pollution in situation (A) than situation (B).  
   C) bargaining between the firm and the victims of the air pollution caused by the firm would lead to a greater reduction in pollution in situation (A) than situation (B).  
   D) bargaining between the firm and the victims of the air pollution caused by the firm would lead to an equal reduction in pollution in situation (A) and situation (B).
13) One difference between the demand for a private good and that for a public good is that
   A) with a private good, each consumer receives different amounts of benefit from consuming
   the product but with a public good, every consumer realizes the same amount of benefit
   from consuming the product.
   B) with a private good, each consumer chooses the quantity she wants to consume but with a
   public good, each consumer chooses the price she is willing to pay for a fixed quantity.
   C) the marginal benefit from consuming the last unit of a public good always exceeds the
   marginal benefit from consuming the last unit of a private good because there are
   externalities in the consumption of the public good.
   D) with a private good, each consumer chooses the quantity she wants to consume but with a
   public good, everyone consumes the same quantity.

14) Private producers have no incentive to provide public goods because
   A) once produced, it will not be possible to exclude those who do not pay for the good.
   B) production of huge quantities of public goods entails huge fixed costs.
   C) the government subsidy granted is usually insufficient to enable private producers to make a
   profit.
   D) they cannot avoid the tragedy of the commons.

15) A carbon tax which is designed to reduce pollution is an example of a
   A) government administrative rule.  B) market-based policy.
   C) noneffective incentive.  D) command-and-control policy.

16) The market demand for a public good can be determined by
   A) adding up how much each consumer is willing to pay for each unit of the public good.
   B) adding up the total private benefits and external benefits that each quantity provides the
   citizens of a country.
   C) adding up how much each citizen expects to consume at each possible price.
   D) estimating the value of the benefit that each unit provides and multiplying that by the
   number of consumers.

17) A negative externality exists if
   A) the marginal private cost of producing a good or service exceeds the social cost.
   B) there are price controls in a market.
   C) the marginal social cost of producing a good or service exceeds the private cost.
   D) there are quantity controls in a market.
Chicken pox vaccinations for toddlers benefit society by protecting young children and by preventing an epidemic of the disease. Thus, the social benefits of chicken pox vaccinations exceed the private benefit for any quantity of vaccinations as illustrated in Figure 5-10.

18) Refer to Figure 5-10. One way to obtain the economically efficient amount of chicken pox vaccinations is for governments to subsidize these vaccinations. What is the size of the per-vaccination Pigovian subsidy that the government must provide to internalize the external benefits?

   A) \( (P_E - P_F) \)    B) \( (P_F - P_G) \)    C) \( P_E \)    D) \( (P_E - P_G) \)

19) Government imposed quantitative limits on the amount of pollution firms are allowed to produce is an example of

   A) a tradable emission allowance system of pollution control.
   B) the Pigovian method of pollution control.
   C) a Coasian solution to pollution reduction.
   D) a command- and- control approach to pollution reduction.
Figure 5-1 shows a market with an externality. The current market equilibrium output of $Q_1$ is not the economically efficient output. The economically efficient output is $Q_2$.

20) **Refer to Figure 5-1.** If, because of an externality, the economically efficient output is $Q_2$ and not the current equilibrium output of $Q_1$, what does $S_1$ represent?  
   A) the market supply curve reflecting external cost  
   B) the market supply curve reflecting social cost  
   C) the market supply curve reflecting implicit cost  
   D) the market supply curve reflecting private cost

21) Some policymakers have argued that products like cigarettes, alcohol, and sweetened soda generate negative externalities in consumption. All else equal, if the government decided to impose a tax on soda, the equilibrium quantity of soda would ______ and the equilibrium price of soda would ______.  
   A) decrease; decrease  
   B) increase; increase  
   C) decrease; increase  
   D) increase; decrease

**TRUE/FALSE.** Write 'T' if the statement is true and 'F' if the statement is false.

22) When negative externalities exist, the competitive market supply curve does not include all of the costs borne by members of society.
ESSAY. Write your answer in the space provided or on a separate sheet of paper.

23) State whether each of the following goods and services is nonrival, nonexcludable or both:
   a. A toll road
   b. A public park
   c. A lighthouse
   d. An art museum
   e. A radio broadcast of "A Prairie Home Companion"

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

24) In the past the federal government often employed what is called a "command and control" approach to the reduction of pollution emissions. Many economists are critical of this approach because
   A) it does not lead to significant reductions in pollution.
   B) the "command and control" approach leads to negative externalities.
   C) they believe a market-based approach will reduce pollution more efficiently.
   D) the "command and control" approach is designed to help firms at the expense of consumers.

25) A negative externality exists if
   A) the marginal social cost of producing a good or service exceeds the private cost.
   B) there are quantity controls in a market.
   C) there are price controls in a market.
   D) the marginal private cost of producing a good or service exceeds the social cost.

26) When there is an externality in a market
   A) the externality will cause the market price to be less than or greater than the equilibrium price.
   B) government intervention may increase economic efficiency.
   C) the externality will move the market to an economically efficient equilibrium.
   D) the government should use price controls to enable the market to reach equilibrium.
Answer Key
Testname: PS8

1) D
2) C
3) B
4) D
5) B

6) Internalizing an externality refers to transferring the external benefit or cost to the producer or consumer that generates the externality. A Pigovian tax transfers a negative externality in production back to the producer, which reduces the supply of the product and results in an efficient level of output. A Pigovian subsidy transfers a positive externality in consumption back to the consumer, which increases the demand for the product and results in an efficient level of output.

7) C
8) C
9) B
10) B
11) B
12) D
13) D
14) A
15) B
16) A
17) C
18) D
19) D
20) D
21) A
22) TRUE

23) a. Nonrival, although rivalry could exist during traffic congestion.
    b. Both, although rivalry could exist under some circumstances, such as when there is a sporting event or a private party.
    c. Both
    d. Nonrival and excludable if admission requires the purchase of a ticket.
    e. Both

24) C
25) A
26) B