

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Level : B.Sc.
Year : III
Time : 2 hrs. 30mins.

18 AUG 2024

Course : ESEE 308
Semester : I
F. M. : 55

SECTION "B"

[55 marks]

Attempt ALL questions. Missing parameters can be assumed suitably.

1.
 - a. Consider two ways of protecting rhinos from poachers in Chitwan National Park, Nepal. In one approach, the government establishes large protected areas within the park, providing sufficient habitat for rhinos to thrive while strictly forbidding local people from entering the park or harming the rhinos and their habitat in any way. In a second approach, the government sets up protected zones within the park and designates 10 nearby villages as official tourist centers, where tourists can stay and embark on guided tours into the park. Consider the different incentives for local villagers—who often live in poverty—in each of these plans. Based on the ten principles of economics you have learned, which plan seems more likely to help the rhino population in Chitwan National Park? Explain. [5]
 - b. Automobiles of the future will most likely be manufactured largely with carbon fibers made from recycled plastics, wood pulp, and cellulose. Replacing half the ferrous metals in current automobiles could reduce a vehicle's weight by 60% and fuel consumption by 30%. One impediment to using carbon fibers in cars is cost. If the justification for the extra sticker price of carbon-fiber cars is solely based on fuel savings, how much extra sticker price can be justified over a six-year life span if the carbon-fiber car would average 39 miles per gallon of gasoline compared to a conventional car averaging 30 miles per gallon? Assume that gasoline costs \$4.00 per gallon, the interest rate is 20% per year, and 117,000 miles are driven uniformly over six years. [5]
2.
 - a. What is the Coase Theorem? Under which conditions will the Coase Theorem be effective, and under which conditions will it fail? Provide separate examples of situations where it works and where it fails. [5]
 - b. Explain why consumers might be unwilling to pay the full costs of a less-polluting car without government regulations. What type of externalities arise in this situation? Illustrate with a suitable diagram. [5]

P.T.O.

3.

- a. Pharmaceutical drugs have inelastic demand, while computers have elastic demand. Assume technological advancement doubles the supply of both products (meaning the quantity supplied at each price is now twice as much as before). [5]
- How do the equilibrium price and quantity change in each market?
 - Which product sees a greater change in price?
 - Which product sees a greater change in quantity?
 - How does total consumer spending on each product change?
- b. A friend in your environmental economics study group suggests that taxes on pollution are ineffective because they do not eliminate all pollution. Based on the ideas from classes on environmental economics, explain what is wrong with this argument. Should the goal of any policy be to eliminate all pollution? If not, what should be the goal? [5]

4.

- a. A nonprofit government corporation is considering two alternatives for generating power: [5]
- Alternative A.* Build a coal-powered generating facility at a cost of \$20,000,000. Annual power sales are expected to be \$1,000,000 per year. Annual operating and maintenance costs are \$200,000 per year. A benefit of this alternative is that it is expected to attract new industry, worth \$500,000 per year, to the region.
- Alternative B.* Build a hydroelectric generating facility. The capital investment, power sales, and operating costs are \$30,000,000, \$800,000, and \$100,000 per year, respectively.

Annual benefits of this alternative are as follows:

Flood-control savings	\$600,000
Irrigation	\$200,000
Recreation	\$100,000
Ability to attract new industry	\$400,000

The useful life of both alternatives is 50 years. Using an interest rate of 5%, determine which alternative (if either) should be selected according to the conventional B-C-ratio method.

- b. In Nepal, many cities have implemented taxes or bans on plastic grocery bags. The rationale behind these measures is the externalities argument: plastic bags are unsightly, occupy space in landfills, and harm fish, birds, and other wildlife. [5]
- In a diagram, illustrate the efficient number of plastic bags and the equilibrium number of plastic bags in the absence of any government policies.
 - Highlight the efficiency loss due to plastic bags in your diagram.
 - Indicate the tax on plastic bags that would achieve the efficient outcome.

- 5.
- a. Sketch generic supply and demand curves for the housing market and label the equilibrium price and quantity. [6]
 - i. A booming economy increases the demand for housing. Show the shift in the demand curve on your graph. What does this do to the price and quantity in the market?
 - ii. You and a friend both notice that more houses are built in response to this change. Your friend says, "this is a sign that the supply curve is shifting as well." You respond, "no, this is actually just a shift along the supply curve." To help your friend understand, demonstrate what you mean on your graph.
 - iii. As it turns out, there actually is a shift in the supply curve due to an unrelated breakthrough in construction that lowers the cost of building houses. In what direction does the supply curve shift? Show this on your graph.
 - iv. Relative to the original price and quantity, what is the overall effect of both shifts on price and quantity?
 - b. A large induced-draft fan is needed for an upgraded industrial process. The motor to drive this fan is rated at 100 horsepower, and the motor will operate at full load for 8,760 hours per year. The motor's efficiency is 92%. Because the motor is fairly large, a demand charge of \$92 per kilowatt per year will be incurred in addition to an energy charge of \$0.08 per kilowatt-hour. If the installed cost of the motor is \$4,000, what is the present worth of the motor over a 10-year period when the MARR is 15% per year? [4]
6. Write a short notes on: [5]
- a. Emission Trading
 - b. Social Choice Mechanism

Use following formulas if needed:
Uniform Series

$$\left(\frac{F}{A}, i, N\right) = \{(1+i)^N - 1\}/i$$

$$\left(\frac{P}{A}, i, N\right) = \{(1+i)^N - 1\}/\{i(1+i)^N\}$$

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Registration No.:

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SECTION "A"

[20 Q. × 1 = 20 marks]

Choose and encircle in the most appropriate option from each set of choices

1. Public goods are typically underprovided because:
 - a. They are rival and excludable.
 - b. They have high production costs.
 - c. They generate positive externalities.
 - d. They are non-rival and non-excludable.

2. If two goods are complements, an increase in the price of one good, other things being equal, results in a (an):
 - a. Rightward shift in the supply curve of the other good.
 - b. Leftward shift in the demand curve of the other good.
 - c. Downward movement along the supply curve of the other good.
 - d. Upward movement along the demand curve of the other good.

3. In a perfectly competitive market, individual firms are:
 - a. Price takers.
 - b. Price setters.
 - c. Able to earn long-term economic profits.
 - d. None of the above.

4. The free-rider problem is most commonly associated with:
 - a. Private goods.
 - b. Public goods.
 - c. Club goods.
 - d. Common resources.

5. Externalities arise when
 - a. the consumption or production activities of one individual or group affect the well-being of others in a way that is not reflected in market prices.
 - b. individuals or firms are able to use resources without paying for them.
 - c. the government intervenes in the market.
 - d. there is perfect competition in the market.

6. The tragedy of the commons refers to
 - a. the overuse of common property resources.
 - b. the efficient allocation of common property resources.
 - c. the privatization of common property resources.
 - d. the government ownership of common property resources.

7. A Pigouvian tax is a tax imposed on
- consumers of a product.
 - producers of a product that generates negative externalities.
 - producers of a product that generates positive externalities.
 - all of the above.
8. Sustainable development is
- economic growth that meets the needs of the present without compromising the ability of future generations to meet their own needs.
 - economic growth that is environmentally friendly.
 - economic growth that is socially equitable.
 - all of the above.
9. The cost that has occurred in the past and has no relevance to estimates of future costs and revenues related to an alternative course of action is referred to as _____
- incremental cost
 - sunk cost
 - indirect cost
 - opportunity cost
10. A recent government study reported that a college degree is worth an extra \$23,000 per year in income compared to what a high-school graduate makes. If the interest rate (i) is 6% per year and you work for 40 years, what is the future compound amount of this extra income?
- \$2,659,486
 - \$1,859,328
 - \$2,959,000
 - \$3,559,526
11. An alternative with an infinite life has a B/C ratio of 1.5. The alternative has benefits of \$50,000 per year and annual maintenance costs of \$10,000 per year. The first cost of the alternative at an interest rate of 10% per year is closest to:
- \$23,300
 - \$85,400
 - \$146,100
 - \$233,000
12. When conducting a benefit-cost analysis, intangible benefits and costs are often:
- Easily quantified in monetary terms.
 - Ignored due to difficulty in measurement.
 - Assigned monetary values based on estimates.
 - Treated as equally important as tangible factors.
13. You have one hour of free time before school each morning. You can spend this time either playing video games, working at Starbucks for \$8 per hour, or babysitting your little brother for \$15 per hour. What is the opportunity cost of playing video games for that hour before school?
- 7
 - 8
 - 15
 - 23
14. The alternative to using resources to produce one good is to use them to produce another good. This concept is known as:
- opportunity cost
 - scarcity
 - production possibility frontier
 - trade-off
15. Which of the following is NOT a factor of production?
- Land
 - Labor
 - Money
 - Capital

16. An effective 12.68% per year, compounded monthly, is the closest to:
a. 12% per year
b. 12% per year, compounded annually
c. 1% per month
d. 1% per month, compounded annually
17. A life-saving medicine without any close substitutes will tend to have
a. a small elasticity of demand.
b. a large elasticity of demand.
c. a small elasticity of supply.
d. a large elasticity of supply.
18. How long would it take for \$500 invested today at 15% interest per year to be worth \$1,000?
a. 5 years
b. 6 years
c. 7 years
d. 8 years
19. All of the following are usually associated with public sector projects except:
a. Funding from taxes
b. Profit
c. Disbenefits
d. Infinite life
20. A small construction company is considering the purchase of a used bulldozer for \$61,000. If the company purchases the dozer now, the equivalent future amount in year 4 that the company is paying for the dozer at 4% per year interest is closest to:
a. \$52,143
b. \$65,461
c. \$71,365
d. Over \$72,000

