

KATHMANDU UNIVERSITY  
End Semester Examination  
January/February 2024

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

12 FEB 2024

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

SECTION "B"

Attempt *ALL* questions. Missing parameters can be assumed suitably.

1.
  - a. A survey shows an increase in drug use by young people. In the ensuing debate, two hypotheses are proposed: [5]  
Hypothesis I: Reduced police efforts have increased the availability of drugs on the street.  
Hypothesis II: Cutbacks in education efforts have decreased awareness of the dangers of drug addiction.
    - i. Use supply-and-demand diagrams to show how each of these hypotheses could lead to an increase in the quantity of drugs consumed.
    - ii. How could information on what has happened to the price of drugs help us to distinguish between these explanations?
  - b. The equilibrium price of coffee mugs rose sharply last month, but the equilibrium quantity was the same as ever. Three people tried to explain the situation. Which explanations could be right? Explain your logic with a diagram. [5]  
Billy: Demand increased, but supply was totally inelastic.  
Marian: Supply increased, but so did demand.  
Valerie: Supply decreased, but demand was totally inelastic.
2.
  - a. The government has decided that the free-market price of cheese is too low. [5]
    - i. Suppose the government imposes a binding price floor in the cheese market. Draw a supply-and-demand diagram to show the effect of this policy on the price of cheese and the quantity of cheese sold. Is there a shortage or surplus of cheese?
    - ii. Farmers complain that the price floor has reduced their total revenue. Is this possible? Explain.
    - iii. In response to farmers' complaints, the government agrees to purchase all the surplus cheese at the price floor. Compared to the basic price floor, who benefits from this new policy? Who loses?
  - b. High-income people are willing to pay more than lower-income people to avoid the risk of death. For example, they are more likely to pay for safety features on cars. Do you think cost-benefit analysts should take this fact into account when evaluating public projects? Consider, for instance, a rich town and a poor town, both of which are considering the installation of a traffic light. Should the rich town use a higher dollar value for a human life in making this decision? Why or why not? Explain. [5]

3.

- a. There is a road between the suburbs and downtown. The road is congested at rush hour. If 100 people use the road at rush hour, the trip takes 30 minutes. If the 101st person enters the road, everyone has to slow down, and the trip now takes 31 minutes. People value their time at \$6 per hour (that is, \$0.10 per minute). For simplicity, ignore all costs of using the road other than the cost of time. [5]
- What is the total social cost of 100 people using the road at rush hour?
  - What is the marginal social cost of the 101st person?
  - The governor of this state, who has taken a Principles of Economics course, would like to institute a toll that would equal the costs the last driver who uses the road imposes on the other drivers. How high should the toll be on this road during rush hour?
  - Suppose that at noon 50 people are using the road. The road is not congested, and the trip takes just 20 minutes. If the 51st driver enters the road, no one has to slow down, and the trip continues to take 20 minutes. How high should the toll be at noon?
- b. Malaria is spread by mosquitoes. That is, a mosquito spreads malaria by biting an infected person and later infusing malaria into a different person. A study by Jeffrey Sachs and others shows a strong correlation between the incidence of malaria in a country and poverty. Malaria is known to exist in poor countries; it has also been found that the incidence of malaria exacerbates poverty. One of the simplest and most effective ways of preventing the occurrence of malaria is by using insecticide-treated nets. [5]
- Consider the private market for insecticide-treated nets. Use supply and demand curves to show the equilibrium level of nets that will be produced. Is this outcome socially efficient?
  - In the graph, how would you account for the insecticide-treated nets' effect on poverty? What happens to the level of output in the market?
  - How could the government encourage the production of an efficient number of nets?

4.

- a. Consider a city with a population of one million, where 60% are willing to contribute a maximum of \$1 each for pollution cleanup, while the remaining 40% are willing to pay \$100 each. The total cost of pollution cleanup is \$2,000,000. The proposal suggests an equal tax on every individual to fund the cleanup. Would this proposal be approved through a majority-rule vote? Is it deemed desirable according to the Pareto criterion? How about from the perspective of the compensation principle? Provide explanations for each response. [5]
- b. DuPont claims that its synthetic composites will replace metals in the construction of future automobiles. "The fuel mileage will double," says DuPont. Suppose the light and stronger "composite automobile" will get 50 miles per gallon of gasoline, and the gasoline costs \$3.50 per gallon. The anticipated life of the automobile is six years,  $i = 10\%$  per year, and annual travel is 20,000 miles. The conventional car averages 25 miles per gallon. [5]
- How much more expensive can the sticker price of the composite automobile be and still have it as an economical investment for a prospective auto buyer?
  - What is the trade-off being made in Part (i)?

5.

- a. In the development of a publicly owned, commercial waterfront area, three possible independent plans are being considered. Their costs and estimated benefits (in thousands) are as follows: [5]

| Plan | Cost | Benefits |
|------|------|----------|
| A    | 123  | 139      |
| B    | 135  | 150      |
| C    | 99   | 114      |

- i. Which plan(s) should be adopted, if any, if the controlling board wishes to invest any amount required, provided that the B-C ratio on the required investment is at least 1.0?
  - ii. Suppose that 10% of the costs of each plan are reclassified as disbenefits. What percentage change in the B-C ratio of each plan results from the reclassification?
  - iii. Comment on why the rank orderings in (a) are unaffected by the change in (ii).
  - iv. What plan should be selected, if the three projects are mutually exclusive?
- b. A new six-speed automatic transmission for automobiles offers an estimated 4% improvement in fuel economy compared to traditional four-speed transmissions in front-wheel drive cars. If a four-speed transmission car averages 30 miles per gallon and gasoline costs \$4.00 per gallon, how much extra can a motorist pay for a fuel-efficient six-speed transmission? Assume that the car will be driven for 120,000 miles over its lifetime of 10 years. The motorist can earn 6% per year on investments. [5]

6.

Write Short notes (*ANY TWO*)

[5]

- a. Coase Theorem
- b. Public policies toward externalities
- c. Privately owned vs publicly owned projects

Use the following formulas if needed:

Uniform Series

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

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

Gradient Series

$$\left\{ \frac{1}{i} \left[ \frac{(1+i)^N - 1}{(1+i)^N} - \frac{N}{(1+i)^N} \right] \right\}$$



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SECTION "A"  
[20Q. × 1= 20 marks]

Encircle the most appropriate answers from the given choices.

1. Which of the following is the result of a decrease in the price of tea, other things being equal?
  - a. A leftward shift in the demand curve for tea
  - b. A downward movement along the demand curve for tea
  - c. A rightward shift in the demand curve for tea
  - d. An upward movement along the demand curve for tea
2. 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
3. An increase in consumer income, other things being equal, will
  - a. shift the supply curve for a normal good to the right.
  - b. cause an upward movement along the demand curve for an inferior good.
  - c. shift the demand curve for an inferior good to the left.
  - d. cause a downward movement along the supply curve for a normal good.
4. An increase in the supply of a good will decrease the total revenue producers receive if
  - a. the demand curve is inelastic
  - b. the demand curve is elastic
  - c. the supply curve is inelastic
  - d. the supply curve is elastic
5. An efficient allocation of resources maximizes
  - a. consumer surplus
  - b. producer surplus
  - c. consumer surplus plus producer surplus
  - d. consumer surplus minus producer surplus
6. The demand curve for cookies is downward sloping. When the price of cookies is \$2, the quantity demanded is 100. If the price rises to \$3, what happens to consumer surplus?
  - a. It falls by less than \$100
  - b. It falls by more than \$100
  - c. It rises by less than \$100
  - d. It rises by more than \$100
7. The Condorcet paradox illustrates Arrow's impossibility theorem by showing that pairwise majority voting
  - a. is inconsistent with the principle of unanimity
  - b. leads to social preferences that are not transitive
  - c. violates the independence of irrelevant alternatives
  - d. makes one person in effect a dictator

8. When the government imposes a binding price floor, it causes
- a. the supply curve to shift to the left
  - b. the demand curve to shift to the right
  - c. a shortage of the good to develop
  - d. a surplus of the good to develop
9. Public goods are
- a. efficiently provided by market forces
  - b. underprovided in the absence of government intervention
  - c. overused in the absence of government intervention
  - d. a type of natural monopoly
10. Common resources are
- a. efficiently provided by market forces.
  - b. underprovided in the absence of government intervention.
  - c. overused in the absence of government intervention.
  - d. a type of natural monopoly.
11. The Tragedy of the Commons is said to arise because:
- a. individuals will fish so long as the marginal private costs equal the marginal private benefits.
  - b. individuals will fish so long as the marginal social costs equal the marginal private benefits.
  - c. individuals will convert open access property into private property.
  - d. individuals will convert open access property into common property.
12. As a general rule, if pollution costs are external, firms will produce
- a. too much of a polluting good
  - b. too little of a polluting good
  - c. an optimal amount of a polluting good
  - d. an amount that cannot be determined without additional information
13. The Coase theorem does NOT apply if
- a. there is a significant externality between two parties.
  - b. the court system vigorously enforces all contracts.
  - c. transaction costs make negotiating difficult.
  - d. both parties understand the externality fully.
14. A government policy that charges steel firms a fee per ton of steel produced (an “effluent charge”) where the fee is determined by the amount of pollutants discharged into the air or water will lead to
- a. a decrease in the market equilibrium quantity of steel produced.
  - b. a decrease in the market equilibrium price of steel.
  - c. an increase in the market equilibrium price of steel.
  - d. the results in (a) and (c).
15. If an investment triples in value in seven years, the rate of return on the investment is nearest to:
- a. 6%
  - b. 17%
  - c. 25%
  - d. 35%

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16. A project has \$15,000 in annual worth of benefits, \$5,000 in annual worth of dis-benefits and \$5,000 in annual worth in cost. What is the benefit cost ratio?  
a. 1                      b. 2                      c. 3                      d. 0
17. The estimated value of a property at the end of its useful life is  
a. Market value      b. Salvage value      c. Book value      d. Original value
18. 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?  
a. 7                      b. 8                      c. 15                      d. 23
19. For an interest rate of 2% per month, the effective semiannual interest rate is:  
a. 2.02%              b. 12.005%              c. 12.31%              d. 12.62%
20. An enthusiastic new engineering graduate plans to start a consulting firm by borrowing \$100,000 at 10% per year interest. The loan payment each year to pay off the loan in 7 years is closest to:  
a. \$18,745              b. \$20,540              c. \$22,960              d. \$23,450



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