

Indian Institute of Technology, Kharagpur
Department of Humanities & Social Sciences

End-Autumn Semester Examination, 2015

Sub. Name: Microeconomics-I
Full Marks 50

Sub. No. HS20005
Time 3 Hrs.

Instruction. Question number 1 is compulsory. Answer any three from the rest.
No queries will be entertained during examination.

1. Argue whether the following statements are true or false giving appropriate reasons in favour of your answer. Prove or disprove your answer, if required. Answer **any four**:
5 × 4 = 20
- (a) All Giffen goods are inferior goods and vice-versa.
 - (b) Steven only consumes two goods: X and Y. If X is a Giffen good for Steven, then Y must be a normal good for Steven.
 - (c) For the Cobb-Douglas production function: $Q = AL^\alpha K^\beta$, where α and β lie between zero and one, the isoquants may not always be downward sloping and convex to the origin.
 - (d) Law of demand holds if the income consumption curve (ICC) is vertical.
 - (e) The expansion path is linear only when the production function is linearly homogeneous.
2. In Country C, cigarettes are forbidden, so people trade cigarettes in a black market. The cigarette demand is $Q_D = 12 - P$, and the cigarette supply is $Q_S = 2P$.
- (a) Find the equilibrium price and quantity in the black market.
 - (b) The government becomes aware of the black market and asks the police to seize and destroy half of the cigarette supply. Under this circumstance, what are the demand and supply functions? What is the new equilibrium price and quantity? Show the change by using a supply and demand diagram.
 - (c) How does the consumer surplus change between (a) and (b)?

P.T.O.

(d) Suppose that the government changes the policy and legalizes cigarette dealings. Now cigarettes are traded in an open market. However, for every unit of the cigarettes bought, the buyer has to pay tax T to the government. T is equal to the pre-tax price P . What are the demand and supply functions under this circumstance? What are the equilibrium (pre-tax) price and quantity? What is the after-tax price paid by buyers?

(e) Compare (b) and (d). Which policy do consumers prefer? Which policy does the government prefer? Why? 1+2+2+2.5+2.5

3. (a) Derive the indirect utility function and the expenditure function for a consumer with Cobb-Douglas utility function: $Q = x_1^\alpha x_2^{1-\alpha}$. Also find out the compensated demand function for good x_1 . What will be the compensated demand when $\alpha = 0.6$?

(b) Suppose the utility function of a consumer over apples (x) and oranges (y) is given by

$$U = (x+1)(y+4)$$

He maximizes utility subject to the budget constraint $P_x x + P_y y \leq \bar{M}$, where $P_y = 1$.

What should be the price of apple if the consumer is consuming only 6 oranges and no apple at the optimum? 7+3

4. (a) Consider a consumer consuming only two goods x and y with the following utility function: $U = y + \log x$

Draw the Engel curve for good X . Can X be a Giffen good? Why or why not?

(b) For a production function: $Q = AL^\alpha K^\beta$ where α and β are positive constants, let marginal productivity of labour is falling. What can you conclude about the marginal productivity of capital if the production function exhibits increasing returns to scale technology (IRS)? Will your answer change if instead you had constant returns to scale (CRS) or decreasing returns to scale (DRS)? 4+6

5. Consider the following production function for a textile manufacturing firm:

$$Q = 1.52L^{0.6}K^{0.4}$$

Suppose that the wage rate and rate of return to capital are \$24 and \$8, respectively.

(a) Find out the short run cost functions (variable cost, marginal cost and total cost) and draw these cost curves given that the amount of capital is fixed at 100 units in the short run.

(b) Further derive the total cost function for the long run when the firm can vary the amount of capital. 5+5