

Indian Institute of Foreign Trade
M.A. 1st year, End-term (First semester)
Microeconomic Theory I
2021-2023
Duration- 2 hours, Total Weight: 60%

The students have to write the answers in pen and paper and upload the answer sheets in Campus 360. Please mention your Roll number.

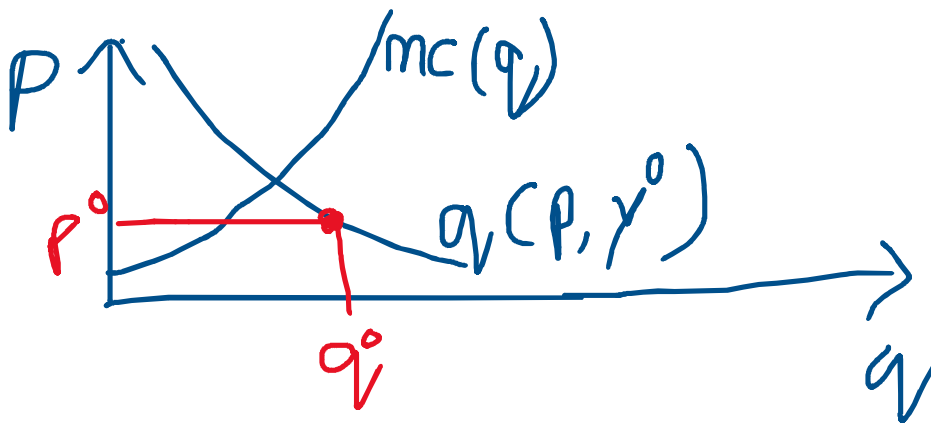
1. Consider the following 2 consumer exchange economy. Suchitra and Uttam each own 10 kilos of sugar and they together own 20 kilos of apples. Using x to denote kilos of sugar and y to denote kilos of apples, Suchitra's and Uttam's preferences are described by the following utility functions respectively:

$$u_s = x_s y_s^4$$

$$u_u = 2x_u + y_u$$

In each of the following cases, determine the market equilibrium price ratio and allocation and depict the equilibrium in an Edgeworth box diagram.

- (a) Suchitra owns 20 kilos of apples and Uttam owns no apples.
 - (b) Suchitra owns 15 kilos of apples and Uttam owns 5 kilos of apples.
 - (c) Suchitra owns no apples and Uttam owns 20 kilos of apples. (20%)
2. The following figure plots the Marshallian demand curve and the marginal cost curve. We assume here that the marginal cost curve coincides with the supply curve for the competitive firms. Consider the price-quantity pair on the demand curve marked in the figure with red colour which is below the competitive equilibrium. Argue that this price-quantity pair is not Pareto-efficient i.e., there exists another price-quantity pair that will Pareto-dominate this by suitable transfer of wealth. (10%)



3. The second theorem of welfare economics asserts that under certain conditions on preferences and production functions, every Pareto optimal allocation is competitive equilibrium allocation for some redistribution of initial endowments. Verify the second welfare theorem for the following two-person, two-commodity (x and y) exchange economy:

$$u_1(x_1, y_1) = x_1, \quad e_1 = (0, 1)$$

$$u_2(x_2, y_2) = x_2 y_2, \quad e_2 = (1, 0)$$

That is, identify all the Pareto optimal allocations, show them in the Edgeworth box and then prove that each is a competitive equilibrium outcome for some redistribution of the total endowment $(1, 1)$. (20%)

4. (a) Check and explain the validity of the following statement:

When the production function is CRS type Hotelling's Lemma is not applicable, but Shephard's Lemma is. (5%)

(b) For a technology which uses two inputs to produce a single input, show that quasi-concavity of the production function is compatible with increasing returns to scale. (5%)