

Question 1

(a) Production Possibilities

(i) Production Possibility Curves:

Australia can produce maximum:

- 20 computers or
- 300 tons rice
- With 10 workers producing either 2 computers or 30 tons rice each

India can produce maximum:

- 50 computers or
- 400 tons rice
- With workers producing either 5 computers or 40 tons rice each

(ii) **Absolute advantage in computers:** India has absolute advantage as it can produce more computers (50 vs Australia's 20) with the same number of workers.

(iii) Comparative advantage in rice:

- Australia's opportunity cost of 1 computer = $30/2 = 15$ tons rice
- India's opportunity cost of 1 computer = $40/5 = 8$ tons rice
- Australia has lower opportunity cost in rice production ($1/15$ vs $1/8$), so Australia has comparative advantage in rice.

(b) Normative vs Positive Statements

- **Normative statement:** Subjective, value-based ("should")
- **Positive statement:** Objective, fact-based

Examples:

1. Positive - makes a factual claim about minimum wage effects
2. Normative - uses "should" indicating a value judgment
3. Positive - makes a factual claim about expenditure effects

(c) PPF Analysis

The Production Possibility Frontier shows:

- Maximum possible combinations of two goods an economy can produce
- **Bowed-out shape** due to increasing opportunity costs as resources aren't perfectly adaptable to both goods
- **Impossible point:** Outside the PPF curve - unattainable with current resources
- **Inefficient point:** Inside the PPF curve - resources not fully utilized

Question 2

(a) Elasticity Calculation

First find equilibrium:

$$Q_d = Q_s \Rightarrow 80 - 6P = -10 + 3P \Rightarrow 90 = 9P \Rightarrow P = 10, Q = 20$$

Price elasticity of demand:

$$E_d = \frac{dQ_d}{dP} \times \frac{P}{Q} = -6 \times \frac{10}{20} = -3 \text{ (Elastic)}$$

Price elasticity of supply:

$$E_s = \frac{dQ_s}{dP} \times \frac{P}{Q} = 3 \times \frac{10}{20} = 1.5 \text{ (Elastic)}$$

(b) Technology Impact

(i) Computer cost reduction:

- More computers supplied
- Lower computer prices
- Increased demand for complementary software
- Higher software equilibrium price and quantity

(ii) Computers substitute for typewriters:

- Typewriter demand decreases
- Lower price and quantity in typewriter market

(iii) Impact on producers:

- Software producers benefit (higher demand)
- Typewriter producers lose (lower demand)

(c) Demand Elasticity Factors

Factors influencing elasticity:

- Availability of substitutes
- Necessity vs luxury
- Time horizon
- Proportion of income spent

Given $E_d = 0.3$ (inelastic), to reduce consumption by 30%:

$$\% \Delta Q = -30\% = E_d \times \% \Delta P \Rightarrow \% \Delta P = \frac{-30\%}{0.3} = 100\%$$

Current price = 60 \rightarrow New price = $60 \times (1 + 1) = \text{Rs}120$

Question 3

(a) Apple Market Analysis

Equilibrium:

$$170 - 2P = -10 + P \Rightarrow 180 = 3P \Rightarrow P = 60, Q = 50$$

Minimum price = 170/70 = 2.43 (below equilibrium) \rightarrow non-binding, no effect. If minimum price was above equilibrium:

- Price rises to minimum
- Quantity demanded falls
- Consumer surplus decreases
- Producer surplus may increase or decrease depending on new quantity

(b) True/False

- (i) **True** - complementary goods: price decrease of one increases demand for both.
(ii) **True** - state-wide drought reduces supply, raising price enough to increase total revenue (if demand inelastic). Local drought only reduces quantity without affecting market price much, reducing revenue.

(c) Price Floors

Non-binding price floor: When set below equilibrium price.

Binding price floor in wheat market:

- Quantity bought/sold decreases
- Farmers' total revenue may increase if demand is inelastic (higher price compensates for lower quantity), or decrease if elastic

Question 4

(a) Tax Analysis

Equilibrium:

$$3P = 200 - P \Rightarrow 4P = 200 \Rightarrow P = 50, Q = 150$$

With Rs40 tax on buyers:

- New demand: $Q_d = 200 - (P + 40) = 160 - P$
- Set equal to supply: $160 - P = 3P \Rightarrow 160 = 4P \Rightarrow P = 40$ (seller receives)
- Buyer pays: $40 + 40 = 80$
- Quantity: $3 \times 40 = 120$

Deadweight loss:

$$\frac{(150 - 120) \times (80 - 40)}{2} = \frac{30 \times 40}{2} = 600$$

(b) Tragedy of Commons & Metro Pricing

Tragedy of Commons: Overuse of shared resources when individuals act in self-interest (e.g., overfishing, overgrazing).

Higher rush hour fares:

- Price discrimination to manage demand
- Reduce congestion during peak times
- More efficient resource allocation (peak-load pricing)

(c) Market-Based Policies for Externalities

1. Pigouvian taxes/subsidies:

- Tax negative externalities (e.g., carbon tax)
- Subsidize positive externalities (e.g., education subsidies)

2. Tradable permits:

- Cap-and-trade systems for pollution
- Example: Emissions trading schemes

3. Coase theorem:

- Assign property rights for private negotiation
- Works when transaction costs are low

Question 5

(a) Television Market Changes

Initial: Price P, Quantity 10,000 (4,000 domestic, 6,000 imports)

After price fall by Rs100: Quantity 12,000 (2,000 domestic, 10,000 imports)

Consumer surplus change:

$$\frac{12,000 + 10,000}{2} \times 100 = \text{Rs}1,100,000 \text{ increase}$$

Producer surplus change:

$$\frac{4,000 + 2,000}{2} \times -100 = \text{Rs} - 300,000 \text{ decrease}$$

Total surplus change:

Rs800,000 increase

(b) Elasticity Concepts

Price elasticity: Responsiveness of quantity demanded to own price changes.

Cross-price elasticity: Responsiveness of quantity demanded to another good's price changes.

Calculation:

$$\% \Delta Q_{\text{noodles}} = \frac{120 - 100}{110} \times 100 \approx 18.18\%$$

$$\% \Delta P_{\text{burger}} = \frac{44 - 40}{42} \times 100 \approx 9.52\%$$

$$\text{Cross elasticity} = \frac{18.18}{9.52} \approx 1.91$$

Interpretation: Positive cross elasticity \rightarrow substitutes (as burger price increases, noodle demand increases)

(c) Externalities

Externality: Uncompensated impact on third parties from economic activity.

- Negative: Pollution, noise
- Positive: Education, vaccinations

Internalizing education externality:

- Subsidize education
- Provide public education
- Tax benefits for educated workers
- Information campaigns about social benefits

Question 6

(a) Tax Analysis

Relationship between tax size and outcomes:

- Small tax \rightarrow small DWL, small revenue
- Increasing tax \rightarrow revenue rises then falls (Laffer curve)
- DWL always increases with tax size
- With inelastic demand: Government can increase revenue by taxing as quantity doesn't fall much

(b) Vaccine Externality

Positive externality: Vaccinated individuals protect others (herd immunity).

Market equilibrium quantity is lower than socially efficient quantity (private benefits < social benefits).

Solution: Government subsidy to reduce effective price, increasing quantity to socially optimal level.

(c) Income Elasticity

Mid-point method:

$$\begin{aligned}\% \Delta Q &= \frac{110 - 100}{105} \times 100 \approx 9.52\% \\ \% \Delta I &= \frac{800 - 1000}{900} \times 100 \approx -22.22\% \\ \text{Income elasticity} &= \frac{9.52}{-22.22} \approx -0.43\end{aligned}$$

Interpretation: Negative elasticity \rightarrow inferior good (demand decreases as income increases).

Question 7

(a) Game Theory

Payoff: Outcome/reward for a player given strategies chosen by all players.

Equilibrium (Nash): No player can benefit by unilaterally changing strategy, given others' strategies.

Example: Prisoner's Dilemma

	Confess	Silent
Confess	-5,-5	0,-10
Silent	-10,0	-1,-1

Nash Equilibrium: (Confess, Confess) even though (Silent, Silent) is better for both.

(b) Tariff Effects

Effects:

- Producer surplus increases (higher domestic production)
- Consumer surplus decreases (higher prices)
- Government gains tariff revenue
- Overall deadweight loss (reduced trade benefits)

Arguments for trade restrictions:

- Protect infant industries
- National security concerns

- Protect domestic jobs
- Retaliate against unfair trade practices

(c) Labor Market During COVID

Scenario:

- Supply increases (more workers available due to migration back to villages)
- Demand decreases (less construction needed due to uncertainty and income loss)

Outcome:

- Significant wage decrease
- Ambiguous effect on employment quantity (depends on relative shifts)
- Likely small net change in quantity with large wage drop