

YANSHAN UNIVERSITY

PRACTICE EXAM SOLUTION – June/July 2025

Unit Name: Economics
Duration: 2 hours
Total Marks: 100
Calculator: Yes, any hand-held calculator approved by Yanshan University

THIS IS A CLOSED BOOK EXAM

IMPORTANT INFORMATION

Mobile phones or any other devices capable of communicating information are prohibited during examinations.

Electronic Organizers/PDAs (with the exception of calculators) or any other similar devices capable of storing restricted text or restricted information are prohibited during examinations.

Other Information: This paper contains 5 questions
Attempt as many questions as you can.
All working must be shown

Surname: _____

Given Name: _____

Student Number: _____

Question 1 (20 marks)

The market demand curve (Q_D) and supply curve (Q_S) of Good Z are given by the following equations:

$$Q_D = 180 - 3P$$

$$Q_S = P + 150$$

- a) **Equilibrium Market Price and Quantity** (5 marks)

Set $Q_D = Q_S$:

$$180 - 3P = P + 150 \Rightarrow 4P = 30 \quad (1 \text{ marks})$$

$$P = 7.5 \quad (2 \text{ marks})$$

$$Q = 180 - 3(7.5) = 157.5 \quad (2 \text{ marks})$$

- b) **Surplus or Shortage at \$12** (5 marks)

$$Q_D = 180 - 3(12) = 144 \quad (1 \text{ mark})$$

$$Q_S = 12 + 150 = 162 \quad (1 \text{ mark})$$

$$\text{Surplus } (1 \text{ marks}) = 162 - 144 = 18 \quad (2 \text{ marks})$$

- c) **Tax of \$4 per unit on producers** (5 marks)

$$Q_S = (P - 4) + 150 = P + 146 \quad (2 \text{ marks})$$

Set $Q_D = Q_S$:

$$180 - 3P = P + 146 \Rightarrow P = 8.5 \quad (1 \text{ marks})$$

$$Q = 180 - 3(8.5) = 154.5 \quad (1 \text{ marks})$$

$$\text{Tax Revenue} = 4 \times 154.5 = 618 \quad (1 \text{ marks})$$

- d) **With a \$5 Subsidy per unit to producers** (5 marks)

Supplier receives $P + 5$, so:

$$Q_S = (P + 5) + 150 = P + 155 \quad (1 \text{ mark})$$

Set $Q_D = Q_S$:

$$180 - 3P = P + 155 \Rightarrow 4P = 25 \quad (1 \text{ mark})$$

$$P = 6.25 \quad (2 \text{ marks})$$

$$Q = 180 - 3(6.25) = 161.25 \quad (1 \text{ mark})$$

e) **Demand Falls by 10% and Supply curve changes** (5 marks)

New demand: $Q_D = 0.9(180 - 3P) = 162 - 2.7P$ (1 mark)

$$162 - 2.7P = 2P + 100 \Rightarrow 4.7P = 62 \quad (1 \text{ mark})$$

$$P \approx 13.19 \quad (1 \text{ marks})$$

$$Q = 162 - 2.7(13.19) = 126.39 \quad (1 \text{ marks})$$

If the supply does not change, then the equilibrium price and quantity would be

$$162 - 2.7P = P + 150 \Rightarrow P = \$3.24 \Rightarrow Q = 153.25$$

Therefore, the increase in supply elasticity causes a **smaller rise in price** and a **larger drop in quantity** compared to what we would observe with the original, less elastic supply curve. (1 mark)

Question 2 (20 marks)

A consumer earns \$60,000 per year and regularly purchases 500 packets of ChocoSnack Bars at a price of \$1.50 each. The price of FruitBites is also \$1.50. The following are the consumer's elasticities of demand for ChocoSnack Bars:

- Price elasticity of demand for ChocoSnack Bars = -1.2
- Income elasticity of demand for ChocoSnack Bars = $+0.8$
- Cross-price elasticity of demand for ChocoSnack Bars with respect to FruitBites = $+0.6$
- Cross-price elasticity of demand for ChocoSnack Bars with respect to AlmondMilk = -0.5

Using the relevant elasticity formulas, calculate and explain the changes in the consumer's demand for ChocoSnack Bars and their total expenditure on ChocoSnack Bars in each of the following scenarios:

a) **The price of ChocoSnack Bars falls to \$1.35, while the price of FruitBites rises to \$1.65.** (10 mark)

1. Own-price effect (using PED):

$$\% \Delta Q_{Choc}^{own} = PED \times \% \Delta P_{Choc} = (-1.2) \times \left(\frac{1.35 - 1.50}{1.50} \right) = +0.12 = 12\% \quad (2 \text{ marks})$$

2. Cross-price effect (using CPED w.r.t. FruitBites):

$$\% \Delta Q_{Choc}^{cross} = CPED \times \% \Delta P_{Fruit} = (0.6) \times \left(\frac{1.65 - 1.50}{1.50} \right) = 0.06 = 6\% \quad (2 \text{ marks})$$

3. Combined percentage change in quantity demanded:

$$\% \Delta Q_{total} = 12\% + 6\% = 18\% \Rightarrow Q_{new} = 500 \times (1 + 0.18) = 590 \text{ bottles} \quad (2 \text{ marks})$$

4. Total Expenditure (TE):

$$TE = 1.35 \times 590 = \$796.50 \quad (2 \text{ marks})$$

Conclusion: Demand increases to 590 bars; TE increases to \$796.50. (2 marks)

b) **The consumer's income decreases to \$57,000 per year.** (7.5 mark)

Use income elasticity of demand (YED):

$$\% \Delta Q = YED \times \% \Delta I = (0.8) \times \left(\frac{57000 - 60000}{60000} \right) = -0.04 = -4\% \quad (2 \text{ marks})$$

$$\text{New quantity} = 500 \times (1 - 0.04) = 480 \text{ bottles} \quad (2 \text{ marks})$$

Total expenditure (TE):

$$TE = 1.50 \times 480 = \$720 \quad (2 \text{ marks})$$

Conclusion: Demand decreases to 480 bars; TE decreases to \$720. (1.5 mark)

c) **The price of AlmondMilk decreases from \$3.00 to \$2.70.** (7.5 mark)

$$\% \Delta Q = (-0.5) \times \left(\frac{2.70 - 3.00}{3.00} \right) = 0.05 = +5\% \quad (2 \text{ marks})$$

$$\text{New quantity} = 500 \times (1 + 0.05) = 525 \text{ bottles} \quad (2 \text{ marks})$$

$$TE = 1.50 \times 525 = \$787.5 \quad (2 \text{ marks})$$

Conclusion: Demand increases to 525 bars; TE increases to \$787.5. (1.5 mark)

Question 3 (20 marks)

Alto Ltd and Bari Ltd are duopolists in the premium bottled water market. Each must independently choose between Premium and Discount pricing strategies. Market outcomes and firm profits (in \$ millions) are shown in the payoff matrix below:

- a) Identify the dominant strategy for each firm, if any. Justify your answer. (15 marks)

		Bari Ltd		Row Min	Row Max
(Alto, Bari)		Premium	Discount		
Alto Ltd	Premium	(5, 2)	(6, 3)	5	6
	Discount	(4, 4)	(3, 5)	3	4
	Col Min	2	3		
	Col Max	4	5		

Alto's maximin strategy is $\max(5, 3) = 5$ (**Premium**) (3 marks)

Alto's maximax strategy is $\max(6, 4) = 6$ (**Premium**) (3 marks)

Bari's maximin strategy is $\max(2, 3) = 3$ (**Discount**) (3 marks)

Bari's maximax strategy is $\max(4, 5) = 5$ (**Discount**) (3 marks)

∴ The dominant strategy for Alto Ltd is **Premium**, whereas the dominant strategy for Bari Ltd is **Discount**. (3 marks)

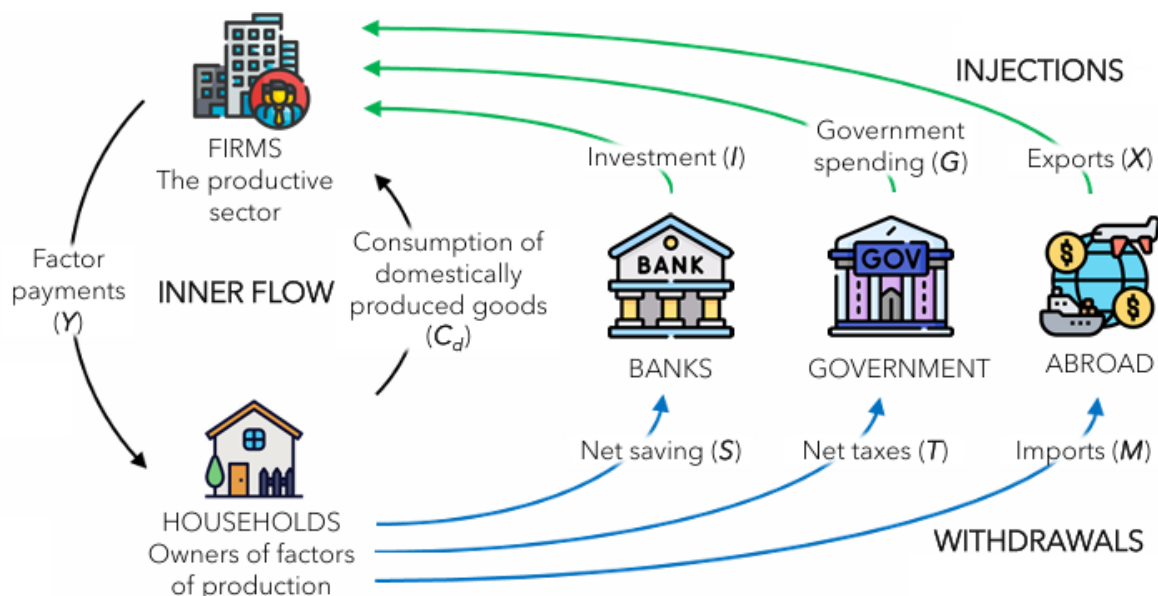
- b) Does a Nash equilibrium exist? Carry out a step-by-step check for each strategy pair. If so, identify it and explain your reasoning. (10 marks)

- (Alto: Premium, Bari: Premium) → (5, 2)
 - ⇒ Alto has no incentive to switch to Discount as $5 > 4$.
 - ⇒ Bari has incentive to switch to Discount as $2 < 3$.
 - ∴ (Alto: Premium, Bari: Premium) is **NOT** a Nash equilibrium. (2 marks)
- (Alto: Premium, Bari: Discount) → (6, 3)
 - ⇒ Alto has no incentive to switch to Discount as $6 > 3$.
 - ⇒ Bari has no incentive to switch to Premium as $3 > 2$.
 - ∴ (**Alto: Premium, Bari: Discount**) is a Nash equilibrium. (2 marks)
- (Alto: Discount, Bari: Premium) → (4, 4)
 - ⇒ Alto has incentive to switch to Premium as $4 < 5$.
 - ⇒ Bari has incentive to switch to Discount as $4 < 5$.
 - ∴ (Alto: Discount, Bari: Premium) is **NOT** a Nash equilibrium. (2 marks)
- (Alto: Discount, Bari: Discount) → (3, 5)
 - ⇒ Alto has incentive to switch to Premium as $3 < 6$.
 - ⇒ Bari has no incentive to switch to Premium as $5 > 4$.
 - ∴ (Alto: Discount, Bari: Discount) is **NOT** a Nash equilibrium. (2 marks)

∴ a Nash equilibrium **exists** when both firms play their dominant strategies (**Alto: Premium, Bari: Discount**). (2 marks)

Question 4 (20 marks)

Complete the space provided to label the circular flow of income diagram of the economy:



a) Suppose the following values are given (in billions):

- $C_d = 800$
- $S = 150, T = 60, M = 120$
- $I = 170, G = 100, X = 60$

i) **Verify whether the economy is in equilibrium.** (5 marks)

- $W = S + T + M = 150 + 60 + 120 = 330$ (1.5 mark)
- $J = I + G + X = 170 + 100 + 60 = 330$ (1.5 mark)
- $W = J = 330$ (1 mark)

\therefore The economy is in equilibrium. (1 mark)

ii) **Calculate the value of national income Y and verify that it's equal to the nominal gross domestic product (GDP).** (5 marks)

$$Y = C_d + W = 800 + 330 = 1130 \quad (1.5 \text{ mark})$$

$$\begin{aligned} GDP &= C + G + I + X - M \\ &= C_d + G + I + X \end{aligned} \quad (1 \text{ mark})$$

$$GDP = 800 + 100 + 170 + 60 = 1130 \quad (1.5 \text{ mark})$$

\therefore When the economy is in equilibrium, Y equals GDP. (1 mark)

iii) **Suppose a country has a real GDP of \$1000 billion in 2025, calculate the GDP deflator and briefly explain the result.** (5 marks)

$$GDP \text{ deflator} = \frac{\text{Nominal } GDP}{\text{Real } GDP} \times 100 = \frac{1130}{1000} \times 100 = 113 \quad (3 \text{ marks})$$

\therefore The GDP deflator for 2025 is 113, indicating that prices have risen by 13% compared to the base year. (2 marks)

Question 5 (20 marks)

Use the circular flow of income and aggregate demand and supply model to illustrate and explain the causes and the differences between demand-pull and cost-push inflation.

The circular flow of income shows the movement of money, goods, and services in an economy between households, firms, the government, and external sectors.

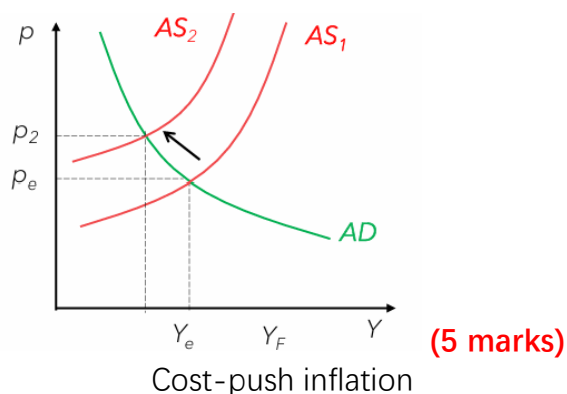
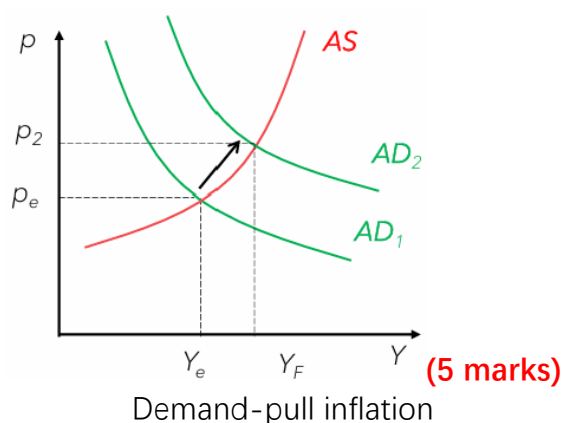
- **Injections (I, G, X)** increase overall spending (Aggregate Demand).
- **Withdrawals (S, T, M)** reduce the flow of income.

DEMAND-PULL INFLATION (5 marks)

- Occurs when Aggregate Demand (AD) increases faster than Aggregate Supply (AS).
- Commonly due to an increase in consumer spending and injections:
- From the circular flow of income,
 - More injections (I, G, X) → higher household income → more consumption (C)
 - Businesses expand output, hire more labour → further boosts income
 - Eventually, spending exceeds output, leading to rising prices
 - AD shifts right from AD_1 to AD_2 → Output rises and so does the price level → demand-pull inflation

COST-PUSH INFLATION (5 marks)

- Occurs when production costs rise, forcing firms to raise prices.
- Commonly due to a rise in wages, high raw material prices, currency depreciation, and supply shocks (e.g. war, pandemic)
- From the circular flow of income
 - Rising input costs → firms reduce supply
 - Higher costs are passed to consumers via higher prices
 - Workers may demand higher wages, fueling further inflation
 - AS shifts left from AS_1 to AS_2
 - Price level rises, but output falls → stagflation risk (inflation + low growth)



END OF EXAMINATION