

IB Diploma

ECONOMICS

HL
Paper 3
2017 — 2024

Chapter 1	Microeconomics	Page 1
Chapter 2	Macroeconomics	Page 90
Chapter 3	International Economics	Page 177
Chapter 4	Development economics	Page 275
	Answers	Page 336

1 - (ECONO/30_HL_Summer_2017_Q1) - Microeconomics

For Firm A, the relationship between inputs and output can be expressed as follows:

Table 1

Land	Labour	Capital	Output
1	20	6	800
2	40	12	1800
3	60	18	3000
4	80	24	4000
5	100	30	4800
6	120	36	5500

(a) Define the term *increasing returns to scale*.

[2]

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(b) Using the data in **Table 1** to support your answer, identify how changes in inputs may result in constant returns to scale **and** in decreasing returns to scale.

[2]

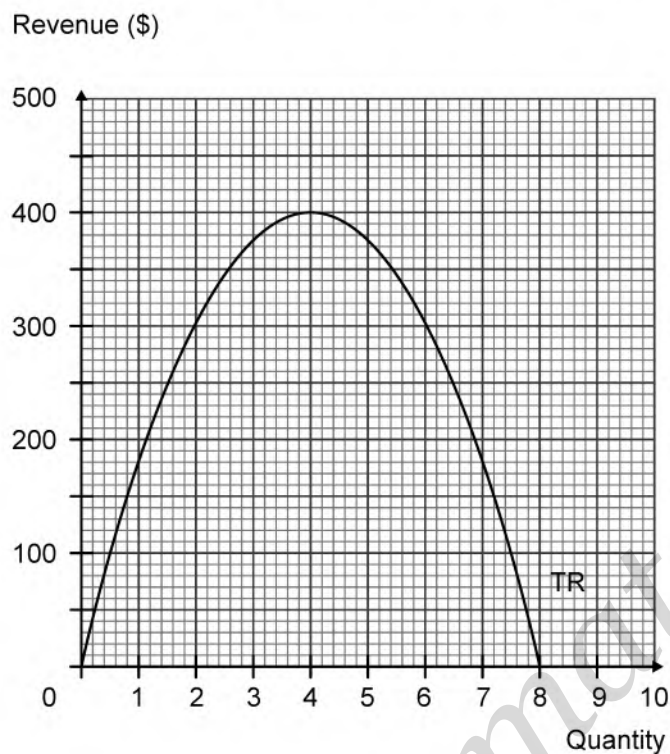
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Consider a monopolist facing a downward sloping, straight line demand curve. The following diagram illustrates the total revenue (TR) curve faced by the monopolist.



(c) Determine:

(i) marginal revenue when output is equal to 4 units.

[1]

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(ii) average revenue when output is equal to 6 units.

[1]

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- (iii) economic profit if output is equal to 2 units and average cost is equal to \$130 per unit.

[1]

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The following table illustrates the demand conditions faced by another monopolist.

Table 2

Price per unit (\$)	Quantity demanded per week (units)
12	0
10	12
8	24
6	36
4	48
2	60

- (d) Calculate the marginal revenue resulting from a fall in price from \$8 to \$6.

[2]

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- (e) Calculate the price elasticity of demand when price falls from \$10 to \$8.

[2]

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- (f) Explain why a profit-maximizing monopolist would never choose to operate on the inelastic portion of its demand curve.

[4]

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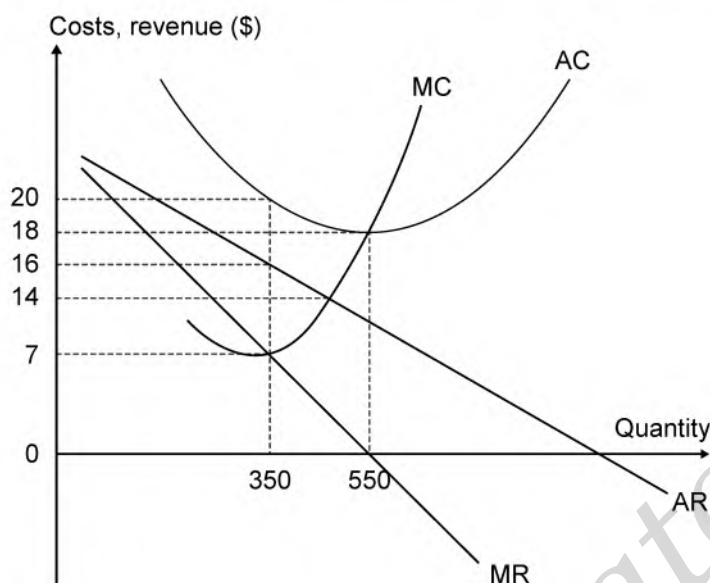
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Firm B operates in a monopolistically competitive market. The following diagram illustrates the marginal cost (MC), average cost (AC), average revenue (AR) and marginal revenue (MR) curves it faces. The diagram is not drawn to scale.



(g) State **two** characteristics of monopolistic competition.

[2]

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(h) Calculate Firm B's short-run profit/loss at the profit-maximizing level of output.

[2]

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- (i) Using the diagram on page 8, explain how long-run equilibrium will be reached.

[4]

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- (j) With reference to the diagram on page 8, outline whether allocative efficiency will be achieved in the long run in a monopolistically competitive market.

[2]

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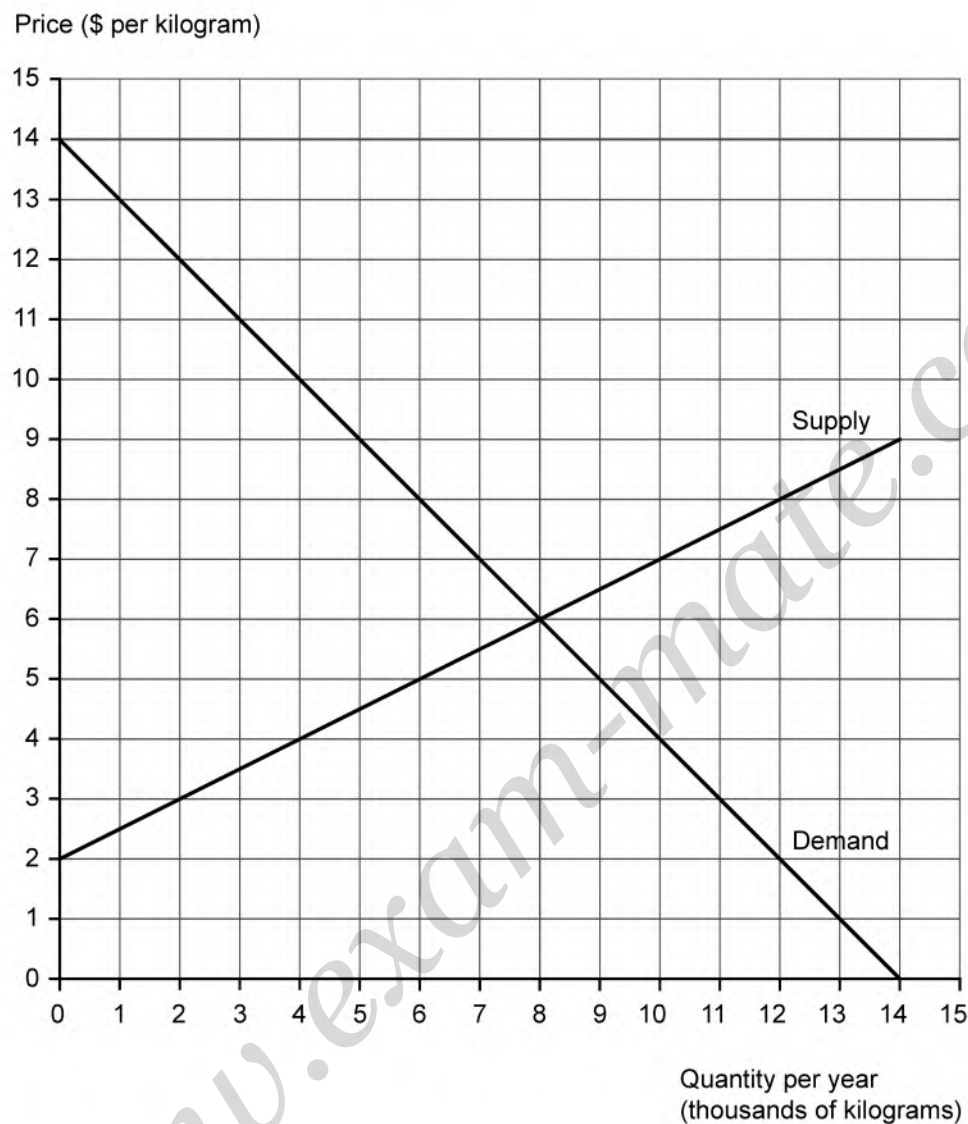
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2 - (ECONO/30_HL_Summer_2017_Q2) - Microeconomics, International Economics

The following diagram illustrates the domestic market for rice in Country Alpha. This diagram will be used for several of the following questions.



(a) Calculate the social surplus at the equilibrium market price.

[2]

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The government in Alpha imposes a price ceiling of \$5 per kilogram.

- (b) (i) Calculate the resulting shortage in the market. [1]

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- (ii) Calculate the change in the consumer surplus after the imposition of the price ceiling. [2]

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- (iii) Calculate the welfare loss after the imposition of the price ceiling. [2]

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A new government in Alpha decides to abolish the price ceiling. Instead, it opens the rice market to imports. The world supply of rice is perfectly elastic; any quantity can be bought for \$3 per kilogram.

- (c) Using the diagram on page 10, calculate the import expenditures on rice. [2]

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- (d) (i) Define the term *comparative advantage*.

[2]

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- (ii) Explain **two** limitations of the theory of comparative advantage.

[4]

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- (e) Alpha's government decides to impose a \$2 tariff on each kilogram of imported rice. Using the diagram on page 10, calculate the government revenue that results from the imposition of the tariff.

[1]

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The following table provides selected data from the balance of payments for Alpha for 2016.

Table 1

	\$ (million)
Net capital transfers	−288
Net current transfers	−170
Net direct investment	361
Exports of services	409
Imports of goods	829
Net investment income	144
Imports of services	435
Exports of goods	852

- (f) (i) Using the data in **Table 1**, calculate Alpha's current account balance for 2016. [2]

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- (ii) Outline how Alpha's current account balance for 2016 is likely to affect the exchange rate of its currency. [2]

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- (g) (i) State **one** way in which the government of Alpha might bring about a depreciation of its currency.

[1]

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- (ii) Following the depreciation, it is observed that the current account balance worsens initially, but improves after a certain period of time. Explain why this might be expected to happen.

[4]

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3 - (ECONO/30_HL_Winter_2017_Q1) - Microeconomics

The demand for a product in a perfectly competitive market is given by the function

$$Q_d = 64 - 2P$$

while market supply is given by the function

$$Q_s = 4P - 8$$

where P is the price per unit in dollars (\$), Q_d is the monthly quantity demanded and Q_s is the monthly quantity supplied in thousands of units.

- (a) (i) State **one** characteristic of a perfectly competitive market. [1]

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- (ii) Outline the reason why the coefficient of price in the supply function above is positive. [2]

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- (b) Calculate the equilibrium price **and** the equilibrium quantity in this market. [2]

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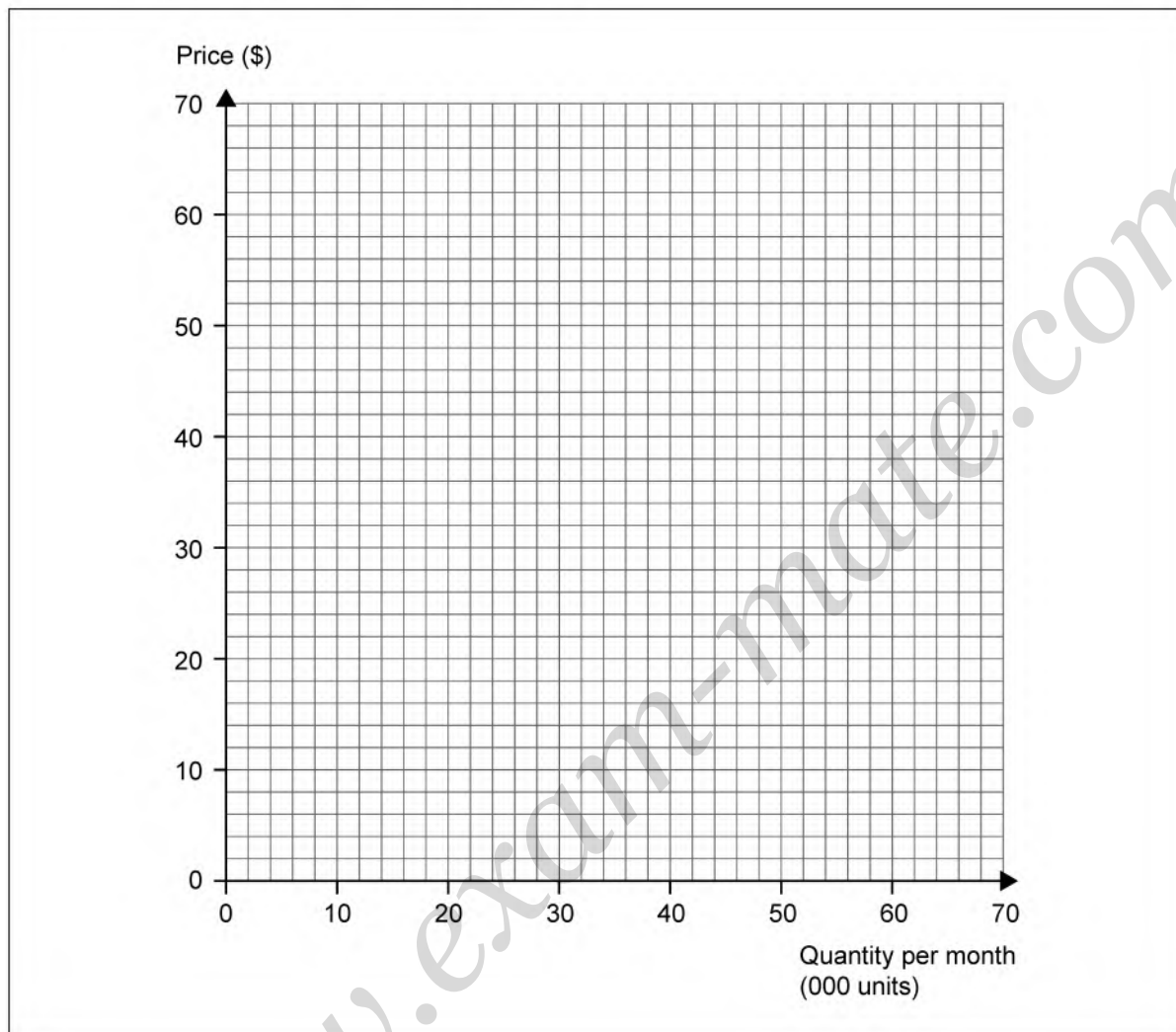
(c) Using the functions, plot the following in the grid below:

(i) a fully labelled market demand curve.

[1]

(ii) a fully labelled market supply curve.

[1]



- (d) Using an appropriate example, explain the significance of price elasticity of demand in relation to the size of the tax revenues a government collects following the imposition of an indirect tax.

[4]

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In order to reduce consumption of the product, the government is considering the imposition of an indirect tax. Following the imposition of the indirect tax, the supply of the product will now be given by the function

$$Q_s = 3P - 8$$

- (e) (i) State the type of indirect tax under consideration.

[1]

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- (ii) Outline the reason for your answer to part (e)(i).

[2]

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- (f) (i) The government decides to impose a \$3 per unit tax on this perfectly competitive market. Plot and label the market supply curve following the imposition of this tax in the grid on **page 3**. [1]

- (ii) Calculate the resulting consumer expenditure **and** producer revenue **and** government tax revenue following the imposition of the \$3 per unit tax. [3]

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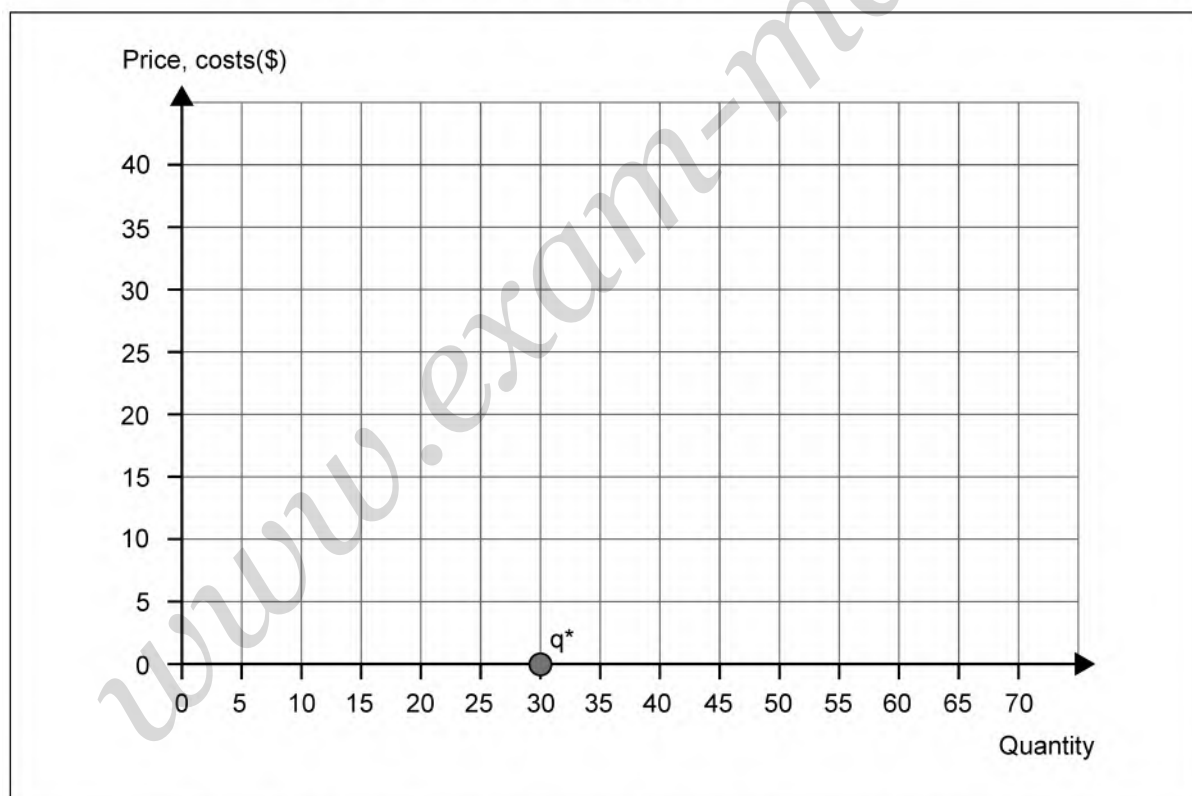
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The questions below refer to a different perfectly competitive market.

- (g) (i) In the following grid, sketch an appropriate marginal cost (MC) curve, if q^* is the profit maximizing level of output for a perfectly competitive firm and the market determined price for the good is \$20 per unit. [1]



- (ii) In the grid above, sketch an average total cost (ATC) curve that would result in economic losses for this firm. [1]

- (h) If a perfectly competitive firm aiming at profit maximization is producing at a level of output for which marginal revenue (MR) > marginal cost (MC), state what action the firm should take with respect to its level of output.

[1]

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- (i) Using an appropriate diagram, explain when a loss-making perfectly competitive firm will shut down in the short run.

[4]



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ANSWERS

1 - (ECONO/30_HL_Summer_2017_Q1) - Microeconomics

(a) Define the term *increasing returns to scale*.

[2]

Level		Marks
0	The work does not meet a standard described by the descriptors below.	0
1	Vague definition. For the idea that if input/inputs are increased, there is a large increase in output / an increase in productivity OR that average costs fall as output increases.	1
2	Accurate definition. For stating that an increase in all inputs leads to a proportionately greater increase in output OR that an increase in all inputs by x% leads to a greater than x% increase in output.	2

(b) Using the data in **Table 1** to support your answer, identify how changes in inputs may result in constant returns to scale **and** in decreasing returns to scale.

[2]

Constant returns are seen when output increases from 3000 to 4000 units (33 % increase in inputs and output).

Decreasing returns are seen if output increases from 4000 units – increase in inputs – 25 % and then 20 %, while output increases by 20 % and then 14.6 %.

OR by taking ratios of inputs and output (*ie* that $5/4 = 100/80 = 30/24 = 4800/4000 = 1.25$)

For identifying and illustrating **one** of these **OR** for identifying but not illustrating both.

[1]

For identifying and illustrating both.

[2]

Any valid combination of inputs used should be accepted. A candidate who focuses on one factor of production only may be awarded a maximum of [1].

(c) Determine:

(i) marginal revenue when output is equal to 4 units.

[1]

\$0 or 0

[1]

(ii) average revenue when output is equal to 6 units.

[1]

\$50

[1]

- (iii) economic profit if output is equal to 2 units and average cost is equal to \$130 per unit. [1]

\$40 [1]

*Candidates who provide an answer of \$20 per unit may not be awarded a mark here but should **NOT** be penalized in part (h) for the same error (giving the answer as "per unit").*

- (d) Calculate the marginal revenue resulting from a fall in price from \$8 to \$6. [2]

$$\frac{\Delta TR}{\Delta Q} = \frac{24}{12}$$

[1]

Any valid working is sufficient for [1] so either 24 or 12 would be sufficient.

= \$2 [1]

An answer of \$2 or 2 without workings is sufficient for [1].

- (e) Calculate the price elasticity of demand when price falls from \$10 to \$8. [2]

$$PED = \frac{\% \Delta Q}{\% \Delta P} = \frac{100}{-20}$$

Any valid working is sufficient for [1].

= -5 or 5 [1]

OR an answer of 3 (or -3) if the midpoint method is used.

An answer of 5 (or -5) without any valid working is sufficient for [1] only.

Correct use of negative sign for ΔP may be present but is not necessary.

- (f) Explain why a profit-maximizing monopolist would never choose to operate on the inelastic portion of its demand curve.

[4]

When demand is price inelastic, a decrease in output / increase in price will:

- increase total revenue
- decrease output and therefore total costs
- increase profit.

[1]

[1]

[1]

Therefore, the profit-maximizing monopolist would never choose to produce on the inelastic portion of its demand curve, as profit could always be increased by raising price.

[1]

Responses which state that if demand is inelastic an increase in output will cause revenue to fall [1] and therefore profits will fall [1] may be awarded a maximum of [2].

OR an accurate explanation such as the one below may be fully rewarded:

MR = MC is a condition for profit maximization.

MC must be a positive number, so MR must be positive at the profit-maximizing level of output.

If MR is positive, then demand must be elastic.

- (g) State **two** characteristics of monopolistic competition.

[2]

- low or zero barriers to entry
- many firms
- product differentiation/some price-setting power
- the firms are small, relative to the size of the industry.

Award [1] for each valid characteristic up to a maximum of [2].

- (h) Calculate Firm B's short-run profit/loss at the profit-maximizing level of output.

[2]

$$350 \times (16 - 20)$$

[1]

Any valid working is sufficient for [1].

$$= -\$1400 \text{ (or a loss of \$1400)}$$

[1]

An answer of \$1400 or 1400 without workings is sufficient for [1].

\$4 with working should be awarded [1] for valid working.

If the candidate provided a "per unit" answer in part (c)(iii) and again here, do not penalize again.

- (i) Using the diagram on page 8, explain how long-run equilibrium will be reached.

[4]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>The response is limited.</i>	1–2
	For an explanation that losses incurred will force some firms to leave the industry.	
2	<i>The response is accurate.</i>	3–4
	For an explanation that losses (of \$1400) incurred will force some firms to leave the industry. As a result, the demand curve faced by remaining firms will shift to the right (reducing losses). The process will continue until remaining firms make normal profits.	

If there is no reference to the diagram (losses or \$1400), a maximum of [3] may be awarded.

- (j) With reference to the diagram on page 8, outline whether allocative efficiency will be achieved in the long run in a monopolistically competitive market.

[2]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>Vague outline.</i>	1
	For stating that allocative efficiency requires that $P = MC$ (or $MB = MC$).	
2	<i>Accurate outline.</i>	2
	For outlining that as $P > MR$, then P cannot equal MC when $MR = MC$.	

A candidate who draws and refers to long run equilibrium on the diagram provided, explaining that it is inconsistent with the position of allocative efficiency, may be fully rewarded. Please note that stating the condition is sufficient for [1], even if the candidate goes on to provide the incorrect conclusion.

2 - (ECONO/30_HL_Summer_2017_Q2) - Microeconomics, International Economics

(a) Calculate the social surplus at the equilibrium market price. [2]

$$0.5 \times 8000 (14 - 2) \quad [1]$$

Any valid working is sufficient for [1].

$$\$48\,000 \quad [1]$$

An answer of \$48 000 or 48 000 without any working is sufficient for [1].

(b) (i) Calculate the resulting shortage in the market. [1]

$$3000 \text{ kg} \quad [1]$$

(ii) Calculate the change in the consumer surplus after the imposition of the price ceiling. [2]

$$(0.5 \times 12 \times 6\,000) - (0.5 \times 8 \times 8\,000) \quad [1]$$

Any valid working is sufficient for [1].

$$= \$4000 \quad [1]$$

An answer of \$4000 or 4000 without any workings is sufficient for [1].

NB if a candidate has calculated the initial consumer surplus in part (a) as part of the social surplus (and workings are seen for this) the "valid working" mark may still be awarded.

(iii) Calculate the welfare loss after the imposition of the price ceiling. [2]

$$0.5 \times 2000 \times 3 \quad [1]$$

Any valid working is sufficient for [1].

$$= \$3000 \quad [1]$$

An answer of \$3000 or 3000 without any working is sufficient [1].

(c) Using the diagram on page 10, calculate the import expenditures on rice. [2]

$$3 \times (11\,000 - 2000) \quad [1]$$

Any valid working is sufficient for [1].

$$= \$27\,000 \quad [1]$$

An answer of \$27 000 or 27 000 without any working is sufficient for [1].

(d) (i) Define the term *comparative advantage*.

[2]

Level		Marks
0	The work does not meet a standard described by the descriptors below.	0
1	Vague definition. The idea that one country can produce more efficiently than another country.	1
2	Accurate definition. An explanation that it is when a country can produce a product at a lower opportunity cost than another country.	2

(ii) Explain **two** limitations of the theory of comparative advantage.

[4]

Level		Marks
0	The work does not meet a standard described by the descriptors below.	0
1	The written response is limited. For a limited explanation of one limitation [1]. For an accurate explanation of only one or a limited explanation of two limitations [2].	1–2
2	The written response is accurate. For accurately explaining any two of the following limitations: - why the assumptions of the theory may not hold in the real world eg constant opportunity costs, zero transport costs, perfect competition, no trade barriers, free movement of factors of production within the country, homogeneous products (inability of the model in explaining intra-industry trade), the static nature of the theory – ignoring changes in technology. (If two of these are explained, full marks may be awarded.) - why application of comparative advantage may not bring about the benefits inherent in the theory eg structural unemployment, infant industry argument, over-specialization (on primary products), over-reliance on trading partners (the strategic argument). (If two of these are explained, full marks may be awarded.) - any other reasonable limitation explained. However, the argument that “it assumes only 2 countries/products” should not be accepted as the theory of comparative advantage is a model which can be generalized. For providing an accurate explanation of one limitation and a limited explanation of another [3]. For providing accurate explanations of two limitations [4].	3–4

(e) Alpha's government decides to impose a \$2 tariff on each kilogram of imported rice. Using the diagram on page 10, calculate the government revenue that results from the imposition of the tariff.

[1]

$$2 (9000 - 6000) = \$6000$$

[1]

- (f) (i) Using the data in **Table 1**, calculate Alpha's current account balance for 2016. [2]

$$(852 - 829 + 409 - 435) + 144 - 170 \quad [1]$$

Any valid working is sufficient for [1].

Valid working must include $(852 - 829 + 409 - 435)$, and may include $+144$ or -170 but **neither** -288 or 361 (as these are not current account items).

$$= -\$29 \text{ million} \quad [1]$$

- (ii) Outline how Alpha's current account balance for 2016 is likely to affect the exchange rate of its currency. [2]

Level		Marks
0	The work does not meet a standard described by the descriptors below.	0
1	Vague outline. For the idea that a deficit will cause the exchange rate to fall.	1
2	Accurate outline. For outlining that a current account deficit implies that the supply of the currency exceeds the demand for the currency causing the exchange rate to depreciate OR demand for currency shifts (has decreased) left OR supply of currency shifts (has increased) right, (or, both) either of which causes a depreciation.	2

OFR applies if a current account surplus has been calculated in part (f)(i).

- (g) (i) State **one** way in which the government of Alpha might bring about a depreciation of its currency. [1]

The central bank may:

- sell the currency (in the foreign exchange market)
- reduce interest rates/increase the money supply
- add to its reserves of foreign currency.

[1]

- (ii) Following the depreciation, it is observed that the current account balance worsens initially, but improves after a certain period of time. Explain why this might be expected to happen.

[4]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>The written response is limited.</i>	1–2
	For the idea that a depreciation makes exports cheaper (and imports more expensive) leading to increased net exports and thus causing an improvement in the current account balance.	
2	<i>The written response is accurate.</i>	3–4
	For an explanation that the effect of a depreciation, which makes exports cheaper (and imports more expensive) depends on the price elasticities of demand for exports and imports; short-term elasticities are relatively low and therefore the current account balance may worsen; only in the long term, when the Marshall-Lerner condition is satisfied, namely that the sum of these elasticities must exceed unity, will it improve.	

NB It is not necessary to refer explicitly to the Marshall-Lerner condition or the J-curve effect.

3 - (ECONO/30_HL_Winter_2017_Q1) - Microeconomics

- (a) (i) State **one** characteristic of a perfectly competitive market.

[1]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	Any one of the following characteristics: • a large number of firms • homogeneous product • absence of barriers to entry (and exit) • price takers • perfect information.	1

- (ii) Outline the reason why the coefficient of price in the supply function above is positive.

[2]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>Vague understanding.</i>	1
	The idea that it is a result of the law of supply OR that there is a positive relationship between price and quantity supplied	
2	<i>Clear understanding.</i>	2
	A brief explanation that at higher prices, quantities supplied are greater since the profit margins of firms are higher (or reference to the idea that marginal costs are likely to increase as output increases or another valid incentive such as to gain more revenue)	

(b) Calculate the equilibrium price **and** the equilibrium quantity in this market.

[2]

$$Q_d = Q_s$$

$$64 - 2P = 4P - 8$$

$$64 + 8 = 4P + 2P$$

$$72 = 6P$$

$$P = \$12.00$$

[1]

$$Q = 4 \times 12 - 8$$

$$Q = 40\,000 \text{ units}$$

[1]

The \$ sign is required, but "units" is not.

*If both are correct but no valid workings are provided a maximum of **[1]** may be awarded.*

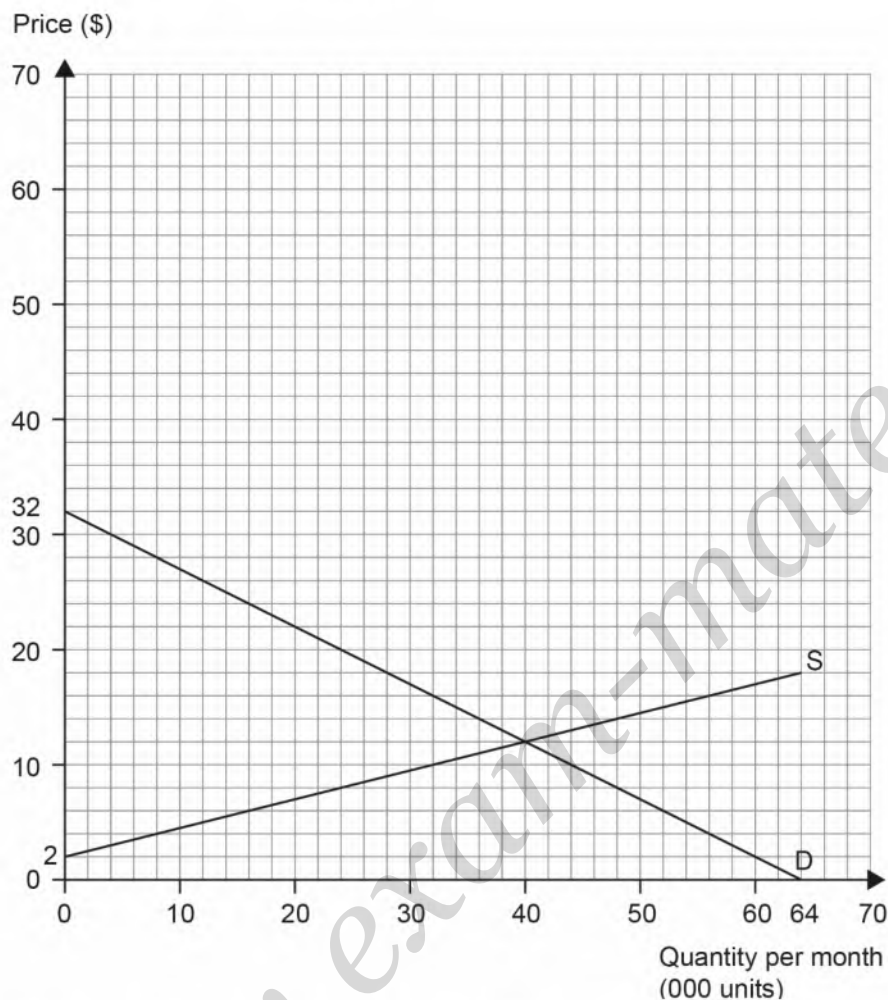
(c) Using the functions, plot the following in the grid below:

(i) a fully labelled market demand curve.

[1]

(ii) a fully labelled market supply curve.

[1]



For a correctly plotted and labelled demand curve.

[1]

For a correctly plotted and labelled supply curve.

[1]

If labels are missing or incorrect a maximum of [1] may be awarded.

If both labels are missing/incorrect then award [0] marks for part (i) and [1] mark for part (ii).

- (d) Using an appropriate example, explain the significance of price elasticity of demand in relation to the size of the tax revenues a government collects following the imposition of an indirect tax.

[4]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>The written response is limited.</i>	1–2
	For explaining that if demand is price inelastic then tax revenues collected by the government would be higher than if demand is price elastic as quantity demanded would decrease by less following the increase in price or for providing an appropriate example(s).	
2	<i>The written response is accurate.</i>	3–4
	For explaining that if demand is price inelastic then tax revenues collected by the government would be higher than if demand is price elastic as quantity demanded would decrease by less following the increase in price and for providing an appropriate example(s). If the example is not explained then the candidate can be awarded up to [3] .	

The example should relate to product(s) with price elastic and/or price inelastic demand.

A numerical example which shows the effect of an indirect tax on tax revenue (but not merely producer revenue) may also be fully rewarded.

*If candidates confuse tax revenue with producer revenue, but demonstrate understanding of elasticities and provide a relevant example, they may be awarded a maximum of **[2]** marks.*

N.B.: reference to percentage changes/proportionality is NOT required.

- (e) (i) State the type of indirect tax under consideration. [1]

Ad valorem or percentage [1]

The name of a tax, such as value-added tax, may not be accepted

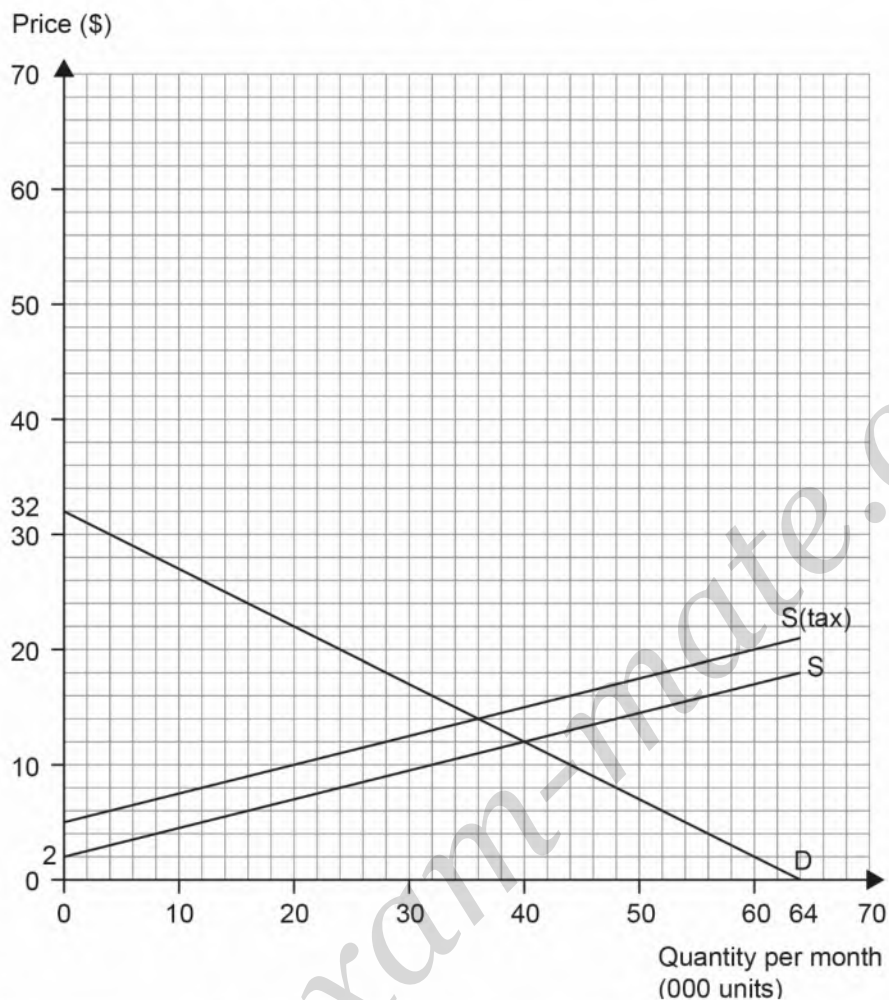
- (ii) Outline the reason for your answer to part (e)(i). [2]

Level		Marks
0	The work does not meet a standard described by the descriptors below.	0
1	Vague response.	1
	The change in "d" value (the coefficient of P) changes the slope of the supply curve OR the idea that the supply curve becomes steeper with an ad valorem tax.	
2	Accurate response.	2
	For outlining that as price / quantity increases, the size of the tax also increases – consistent with <i>ad valorem</i> – causing the supply curve to be steeper as a result of the change in the coefficient.	

To achieve level 2, the response must refer to the change in the coefficient of price (the "d" value) and to the change in the size of the tax as price/quantity increases.

- (f) (i) The government decides to impose a \$3 per unit tax on this perfectly competitive market. Plot and label the market supply curve following the imposition of this tax in the grid on **page 3**.

[1]



For a correctly plotted and labelled new supply curve \$3 above the original supply curve.

[1]

OFR applies.

- (ii) Calculate the resulting consumer expenditure **and** producer revenue **and** government tax revenue following the imposition of the \$3 per unit tax.

[3]

Consumer expenditure

$$14 \times 36\,000$$

\$504 000

[1]

An answer of \$504 000 (without workings) is sufficient for [1].

Producer revenue

$$11 \times 36\,000$$

\$396 000

[1]

An answer of \$396 000 (without workings) is sufficient for [1].

Tax revenue

$$3 \times 36\,000$$

\$108 000

[1]

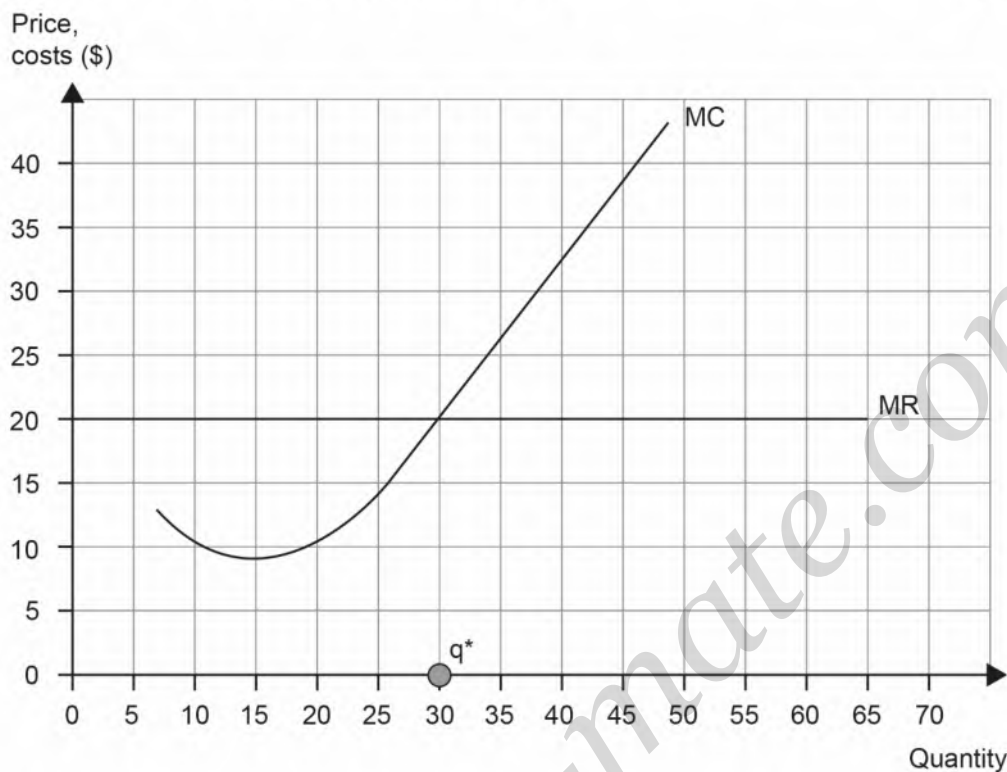
An answer of \$108 000 (without workings) is sufficient for [1].

The tax revenue may also be calculated by subtracting producer revenue from consumer expenditure.

OFR applies. Examiners will need to examine the graph carefully and reward valid working.

- (g) (i) In the following grid, sketch an appropriate marginal cost (MC) curve, if q^* is the profit maximizing level of output for a perfectly competitive firm and the market determined price for the good is \$20 per unit.

[1]



For a correctly sketched MC curve that intersects the horizontal at \$20.00 MR above q^* . The MC curve must cut the \$20 line from below ie minimum MC must be below \$20

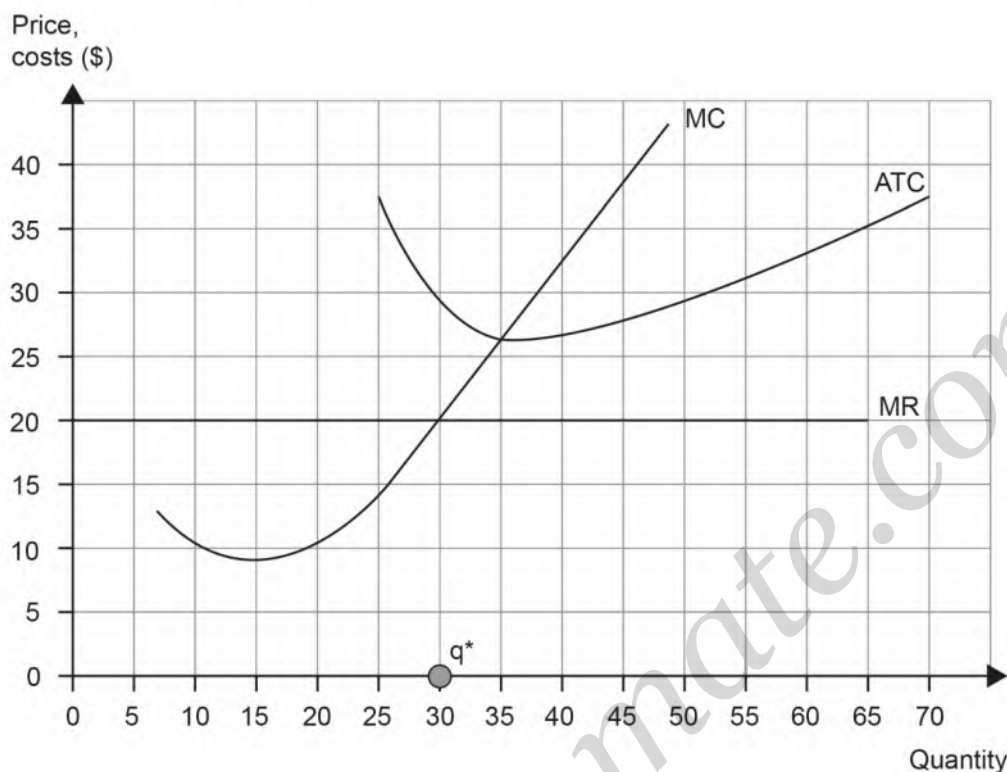
[1]

A diagram which includes (a range of) inaccurate curves, such as downward-sloping MR/AR, should be given [0] marks.

A labelled MR (or P) curve is not necessary for part (i) or for part (ii).

- (ii) In the grid above, sketch an average total cost (ATC) curve that would result in economic losses for this firm.

[1]



For a correctly sketched U shaped ATC lying above $MR=AR=20$ at all quantities and with the MC curve intersecting the ATC at the minimum ATC.

[1]

A labelled MR (or P) curve is not necessary for part (i) or for part (ii).

- (h) If a perfectly competitive firm aiming at profit maximization is producing at a level of output for which marginal revenue (MR) > marginal cost (MC), state what action the firm should take with respect to its level of output.

[1]

It should increase output.

[1]

- (i) Using an appropriate diagram, explain when a loss-making perfectly competitive firm will shut down in the short run.

[4]

Level		Marks
0	<i>The work does not meet a standard described by the descriptors below.</i>	0
1	<i>The written response is limited.</i>	1–2
	For a diagram which shows price below a U-shaped AVC curve, with explanation that the firm would shut down if price falls below AVC Or an explanation that in the short run a firm faces fixed costs which are unavoidable so it will shut down if the price is less than minimum AVC as at any level of output it would lose more than the unavoidable fixed costs	
2	<i>The written response is accurate.</i>	3–4
	For a diagram which shows price below a U-shaped AVC curve, with explanation that the firm would shut down if price falls below AVC AND an explanation that in the short run a firm faces fixed costs which are unavoidable so it will shut down if the price is less than minimum AVC as at any level of output it would lose more than the unavoidable fixed costs	

A response which explains accurately that, if $AVC < P < ATC$, the firm should NOT shut down, may be fully rewarded.