Please check the examination details below before entering your candidate information

Candidate surname	Other names
StemUp Model Solution	

Centre Number | Candidate Number

Pearson Edexcel Level 3 GCE

Monday 13 May 2024

Morning (Time: 1 hour 30 minutes)

Paper reference **8EC0/01**

Economics A

Advanced Subsidiary

PAPER 1: Introduction to Markets and Market Failure

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- There are two sections in this question paper.
- Answer **all** questions in Section A.
- In Section B, answer **all** of questions 6(a) to 6(e) and **one** question from 6(f) or 6(g).
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Calculators may be used.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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SECTION A

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

You are advised to spend 25 minutes on this section.

Use the data to support your answers where relevant. You may annotate and include diagrams in your answers.

1 Scarcity of non-renewable resources, such as oil, is a key reason why alternative resources have been developed by economies. In recent years, within the energy market there has been a large increase in the production of wind power.

(a) With reference to the information provided, explain the distinction between renewable and non-renewable resources.

(3)

Renewable resources are resources that can naturally replenish themselves, so they will not run out if used sustainably. Wind power is renewable, as the wind is continually available, so using it today does not reduce the amount available in the future.

Non-renewable resources are limited in supply; once used they cannot be replaced, so they cannot be used sustainably and will eventually run out. Oil is non-renewable, as it took millions of years to form and its stock falls every time it is extracted and burnt.

This is why, as oil becomes scarcer, economies are developing alternatives such as wind power.

(b) Which **one** of the following best describes 'scarcity'?

(1)

☐ **A** An extension of the demand curve

☐ **B** Excess supply

☒ **C** Insufficient resources to satisfy wants

☐ **D** The misallocation of resources

(Total for Question 1 = 4 marks)

2 Vanilla bean prices increased to a record $600 a kilogramme in 2018 after a cyclone hit the tropical island of Madagascar, damaging crops. Madagascar supplies 75% to 80% of the world vanilla bean market.

(a) Define the term 'supply.'

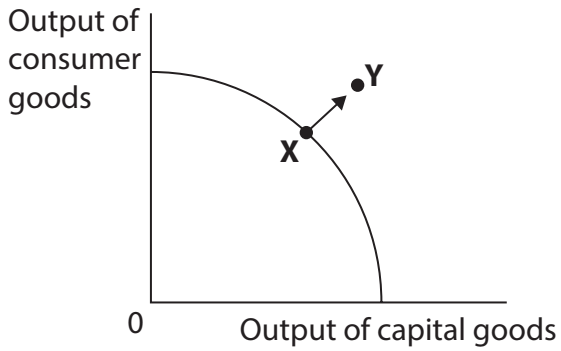
(1)

Supply is the quantity of a good or service that producers are willing and able to sell at a given price over a given time period.

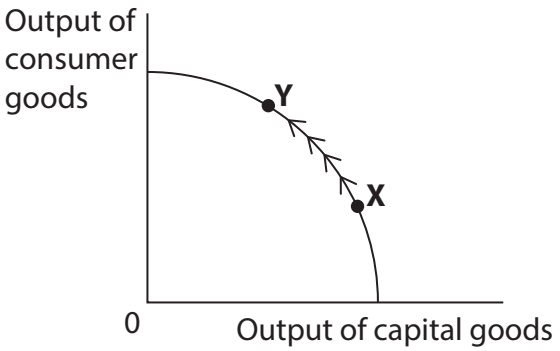
(b) The diagrams below show movements from position X to Y on production possibility frontiers. In which **one** of the diagrams does the movement from X to Y illustrate the most likely impact on Madagascar's economy of a natural disaster such as a cyclone?

(1)

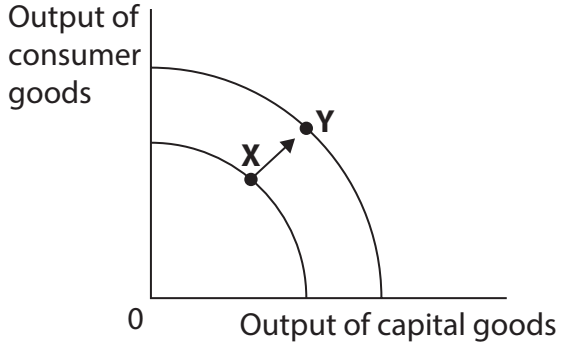
☒ **A**



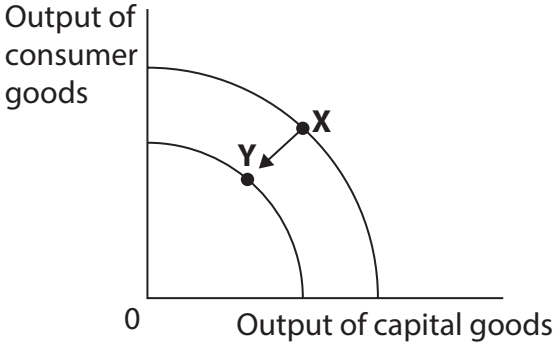
☒ **B**



☒ **C**



☒ **D**



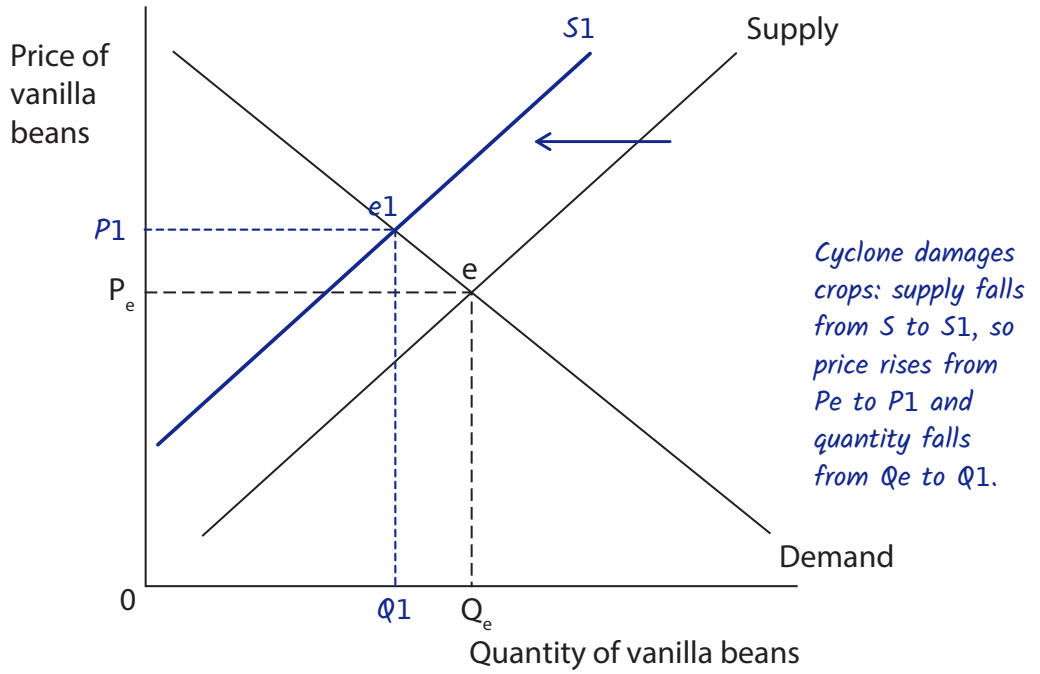
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(c) Annotate the diagram below to show the effect of the cyclone on the price of vanilla beans.

(2)



(Total for Question 2 = 4 marks)

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3 Singapore is mainly a free market economy.

(a) Which **one** of the following statements about a free market economy is true?

(1)

- ☐ **A** It was supported by Karl Marx
- ☒ **B** The price mechanism allocates all resources
- ☐ **C** There are no externalities
- ☐ **D** The state owns all the resources

The education system in Singapore produces some of the highest achieving students in international education rankings, with its teenagers coming top in tests in mathematics, reading and science.

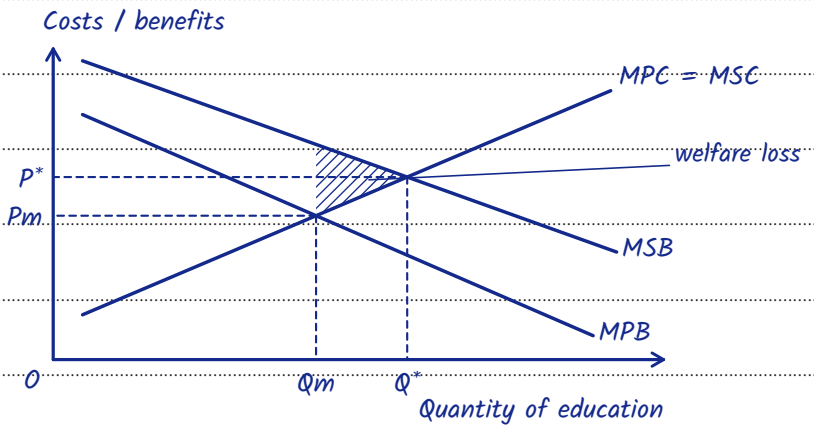
(b) Singapore's education system is provided by the state. With reference to the information above, explain why education is normally provided by the state.

(3)

Education is a merit good, which would be underprovided in a free market because individuals do not consider the positive consumption externalities, the external benefits to third parties such as a more productive workforce, higher tax revenue and lower crime.

There is also asymmetric information: students and parents may not know the full long-term benefits of education, so MPB lies below MSB. In a free market only Qm would be consumed rather than the social optimum Q where MPC = MSB, creating the shaded welfare loss in my diagram.*

Therefore the state provides education free at the point of use, funded by tax



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revenue, raising consumption towards Q*. Singapore shows the benefit, with its state-educated teenagers coming top in international tests in mathematics, reading and science.

(Total for Question 3 = 4 marks)

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4 Statement 1

Finland has schools with an average class size of 19.6

Statement 2

Other countries ought to set school class sizes similar to Finland.

(Source adapted from: https://www.oph.fi/en/news/2019)

(a) Which **one** of the following best describes the two statements above?

(1)

		Statement 1	Statement 2
☒	**A**	Normative	Normative
☒	**B**	Normative	Positive
☒	**C**	Positive	Normative
☒	**D**	Positive	Positive

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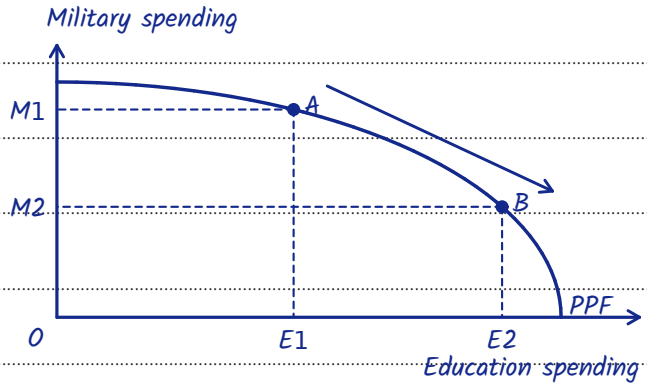
5% of total government spending in Finland is on education and therefore other areas of the economy have reduced funding as a result, including the military despite an increase in recent global conflicts.

(b) With reference to the information above, explain what is meant by 'opportunity cost'.

(3)

Opportunity cost is the value of the next best alternative forgone when an economic decision is made.

Due to scarcity, the Finnish government cannot fund everything. Spending 5% of total government spending on education means other areas, such as the military, have reduced funding despite recent global conflicts. The military spending given up is the opportunity cost of education: a movement from A to B on the PPF.



(Total for Question 4 = 4 marks)

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5 Chief Executive Elon Musk said "affordability" was the biggest barrier to Tesla reaching a far larger market. Before recent price cuts for its electric vehicles, he said, "We weren't sure about what the price elasticity of demand was for Tesla. We found that even small changes in price have a big impact on demand."

(Source adapted from: https://www.ft.com/)

(a) In June 2023, Tesla further reduced the price of its Model 3 vehicle by £4 200 from £42 990. It has been forecast that the price cut will lead to a 15% increase in demand. *Ceteris paribus*, calculate the price elasticity of demand for the Model 3. You are advised to show your working.

(2)

PED = % change in quantity demanded ÷ % change in price

New price = £42 990 − £4 200 = £38 790

% change in price = (−£4 200 ÷ £42 990) × 100 = −9.77%

PED = +15% ÷ −9.77% = −1.54 (price elastic)

(b) Define the term '*ceteris paribus*'.

(1)

Ceteris paribus means 'all other things being equal': all other factors that affect demand are held constant, so that only the effect of the change in price is measured.

(c) Which **one** of the following is most likely to be a determinant of price elasticity of demand for the Model 3 electric vehicle?

(1)

- ☒ **A** Availability of substitute electric vehicles
- ☐ **B** Change in population size
- ☐ **C** Increase in the cost of steel
- ☐ **D** Number of unsold Model 3 electric vehicles

(Total for Question 5 = 4 marks)

TOTAL FOR SECTION A = 20 MARKS

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QUESTION 6 BEGINS ON THE NEXT PAGE.

SECTION B

Read Figure 1 and the following extracts (A, B and C) before answering Question 6.

Answer ALL Questions 6(a) to 6(e) and EITHER Question 6(f) OR Question 6(g).

You are advised to spend 1 hour 5 minutes on this section.

Question 6

The market for plastic in the UK

Figure 1: Trend in the purchase of single-use plastic bags in millions, UK, 2014 to 2021

2014	2015	2016	2017	2018	2019	2020	2021
7 500	2 120	1 750	1 130	1 040	627	496	197

Extract A

10p charge continues to reduce use of plastic carrier bags

The 5p charge on single-use carrier bags was introduced in supermarkets in 2015. The charge was increased to 10p in 2021 and extended to all businesses.

The UK Environment Minister said that the plastic bag charge has ended the irrational purchase of billions of single-use carrier bags, thereby protecting our landscapes and ensuring millions of pounds are redistributed to worthy causes. This was needed as without this legislation, the market is not able to effectively manage the situation. Consumers are now in the habit of bringing reusable carrier bags when shopping.

In addition to single-use carrier bag charges, major retailers have offered bottle deposit return schemes and refillable food and cleaning product options. These provide incentives to consumers to reuse their plastic containers.

However, retailers have suggested that most customers do not wish to pay more for cleaning products in reusable packaging. With the average household income falling by 4.3% in 2023, sales of refillable cleaning products are expected to fall from 200 000 to 130 000 this year.

(Source adapted from: https://www.circularonline.co.uk/news/)

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Extract B

Plastic packaging tax

Food manufacturers have criticised the implementation of a new UK environmental tax, warning it will force them to increase prices for consumers.

The 2018 tax was designed to provide incentives to businesses to use recycled plastic in packaging. Businesses manufacturing or importing 10 tonnes or more a year of plastic packaging that contains less than 30% recycled plastic are taxed at £200 a tonne. Plastic packaging containing more than this will be exempt from the tax.

Helene Roberts, Chief Executive of Robinson Packaging, said increased prices for the consumer would be an unintended consequence of the tax. "It will just create inflationary pressures within the supply chain and firms may need to pass this on." A wide range of businesses are affected by the new tax, including retailers importing items such as bin liners, drink bottles and carrier bags. Food manufacturers are particularly impacted as the industry uses 40% of packaging in the UK.

(Source adapted from: https://www.ft.com)

Extract C

Single-use cups

An estimated 2.5 billion single-use cups are used in the UK every year by consumers buying coffee from chains and cafes, creating approximately 25 000 tonnes of waste. Research has found that while a 25p charge on single-use cups increases the use of reusable coffee cups in coffee shops, a discount on reusable coffee cups has no impact at all on their use.

A 25p charge on single-use cups increases the use of reusable coffee cups by 3.4%. Environmental messaging in cafes, for example posters about litter, increases the use of reusable coffee cups by 2.3%. The availability of reusable cups leads to an increase of 2.5% whereas the distribution of free reusable cups leads to a further increase of 4.3%.

"While the increases for individual measures were modest, the greatest behavioural change was when the measures were combined," said Wouter Poortinga of Cardiff University.

(Source adapted from: https://www.theguardian.com/environment/2017/mar/30/)

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6 (a) Explain what is meant by the 'unintended consequence' (Extract B, line 9) of the plastic tax.

(5)

(b) With reference to Extract A and your own knowledge, assess the view that it is irrational to buy plastic carrier bags when shopping.

(10)

(c) With reference to Extract A, explain the likely numerical value for the income elasticity of demand for reusable cleaning products.

(4)

(d) With reference to Extract C, explain how incentives to use reusable coffee cups may lead to a fall in demand for single-use cups.

(6)

(e) Discuss the likely private costs and external costs of the production of plastic.

(15)

EITHER

(f) Evaluate the likely impact of a tax on plastic food-packaging. Use a diagram to support your answer.

(20)

OR

(g) Evaluate methods of government intervention which could be used to reduce the market failure associated with plastic waste. Use a diagram to support your answer.

(20)

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6 (a) Explain what is meant by the 'unintended consequence' (Extract B, line 9) of the plastic tax.

(5)

An unintended consequence is an unplanned distortion of consumer or producer behaviour resulting from an economic decision, such as a government intervention, which was not the aim of the policy.

The plastic packaging tax of £200 a tonne (on packaging with less than 30% recycled plastic) was 'designed to provide incentives to businesses to use recycled plastic'. However, it raises firms' costs and creates 'inflationary pressures within the supply chain', which firms may pass on to consumers as higher prices. Food manufacturers are particularly affected because they use 40% of packaging in the UK, so food prices may rise.

As demand for food is price inelastic, much of the incidence of the tax falls on consumers, leaving people worse off. This is regressive, as low-income households spend a larger proportion of their income on food. Firms may also switch to thinner plastic, which can increase food waste.

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(b) With reference to Extract A and your own knowledge, assess the view that it is irrational to buy plastic carrier bags when shopping.

(10)

Rational behaviour means consumers weigh up private costs and benefits in order to maximise their utility. The UK Environment Minister claims the plastic bag charge has ended the 'irrational purchase of billions of single-use carrier bags'.

There is strong evidence that much buying of bags was irrational. Before the charge, bags were free and consumers took them out of habit, without considering the alternatives: reusable 'bags for life' are available and can be used on many visits. Consumers also ignored the negative externalities of bags, such as litter and damage to wildlife, and the need for 'protecting our landscapes'. Once a price was attached, purchases fell from 7 500 million in 2014 to 197 million in 2021, a fall of over 97%, as the 5p charge from 2015 rose to 10p in 2021. Such a large fall when the charge is tiny suggests most of the earlier purchases gave consumers very little utility.

Buying new bags each visit also reflects computational weakness: a shopper buying three bags twice a week at 10p spends over £30 a year on something they could avoid, but fails to add up these small costs. Since consumers are now 'in the habit of bringing reusable carrier bags', the habit formed by the charge shows that the previous behaviour was not a considered choice.

However, it may not be irrational for every consumer. A shopper who forgets their bags, is rushing, or makes an unplanned trip on the way home may rationally buy a bag, as the marginal benefit of carrying their shopping clearly exceeds the 10p cost. With consumers making several visits to supermarkets each week, it is not always possible to bring previously purchased bags. A 10p bag is a very small percentage of income, so the charge is not high enough to discourage purchase for many people, and the 197 million bags still bought in 2021 may be mostly such rational

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purchases. Some shoppers may also value that the proceeds go to worthy causes. Overall, buying bags was largely irrational when they were free and habitual, but today, at 10p, the remaining purchases are more likely to be rational choices given convenience. Whether it is irrational depends on the individual's circumstances and on whether we judge from a private or a social perspective.

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(c) With reference to Extract A, explain the likely numerical value for the income elasticity of demand for reusable cleaning products.

(4)

Income elasticity of demand (YED) = % change in quantity demanded ÷ % change in income

% change in quantity demanded = (130 000 – 200 000) ÷ 200 000 × 100 = –35%

% change in income = –4.3%

YED = –35% ÷ –4.3% = +8.14

The YED is positive (greater than 0), so reusable cleaning products are a normal good. As it is greater than +1, demand is highly income elastic, so they are a luxury good: when average household income fell by 4.3% in 2023, sales fell more than proportionately, by 35%, because most customers do not wish to pay more for cleaning products in reusable packaging when incomes are falling.

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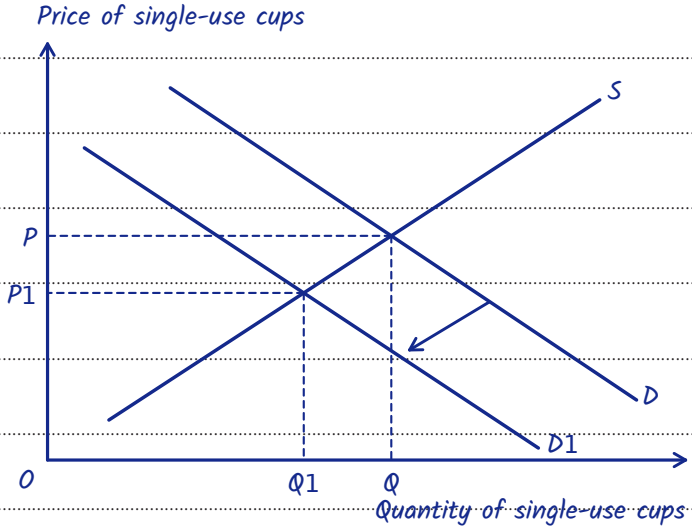
(d) With reference to Extract C, explain how incentives to use reusable coffee cups may lead to a fall in demand for single-use cups.

(6)

Reusable cups and single-use cups are substitutes, so they have a positive cross elasticity of demand (XED): if reusable cups become relatively cheaper or more attractive, demand for single-use cups falls.

Extract C shows that the availability of reusable cups increases their use by 2.5%, and the distribution of free reusable cups leads to a further increase of 4.3%. Free cups make reusables cheaper than single-use, so consumers switch due to the price differential.

Environmental messaging, such as posters about litter, increases the use of reusable cups by 2.3%. This reduces asymmetric information about the external costs of



single-use cups, which create 25 000 tonnes of waste a year, so consumers' demand for them falls.

As shown in my diagram, demand for single-use cups shifts left from D to D1, so price falls from P to P1 and quantity from Q to Q1.

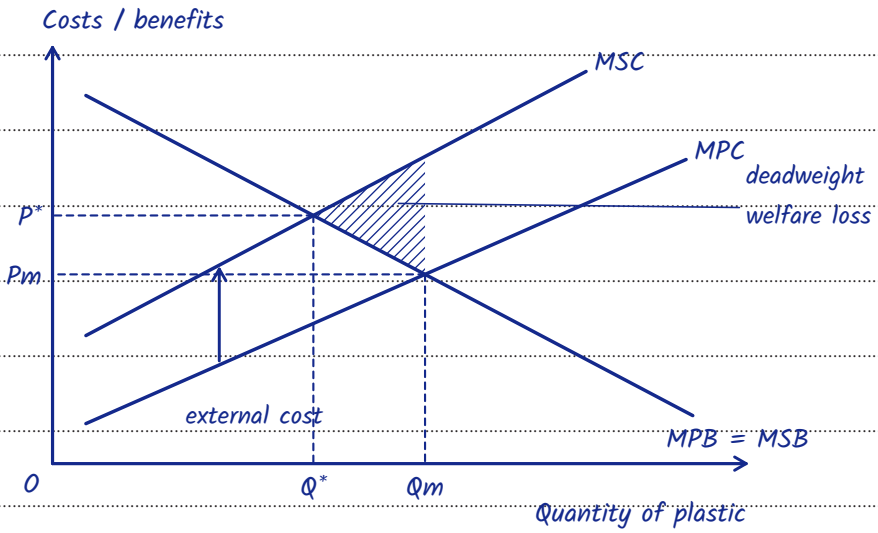
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(e) Discuss the likely private costs and external costs of the production of plastic.

(15)

Private costs are the costs paid by the producer itself. External costs are the costs imposed on third parties who are not involved in the transaction. Together they make up the social cost: MSC = MPC + external costs.

The private costs of producing plastic include the purchase of capital machinery and equipment needed to produce plastic packaging and products, and the raw materials and inputs, such as oil, needed to make different varieties of plastic. Demand for these inputs is a derived demand from the demand for plastic. Firms also pay



wages and energy costs, and now taxes: Extract B shows that businesses manufacturing or importing 10 tonnes or more a year of plastic packaging containing less than 30% recycled plastic are taxed at £200 per tonne, adding to their private costs.

The external costs of producing plastic are substantial. Manufacturing plastic produces CO2, contributing to climate change, while plastic waste causes litter, damage to wildlife and micro-particles ending up in the water system and in animals. Extract C shows that 2.5 billion single-use cups create about 25 000 tonnes of waste a year, which must be collected or sent to landfill at a cost to

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councils and taxpayers. These costs are borne by third parties, not by producers.

Because firms only consider their private costs, they produce at Qm, where MPC = MPB, rather than at the social optimum Q^*, where MSC = MSB. Plastic is overproduced and underpriced, as the price Pm does not reflect the full social cost, leading to a misallocation of resources and the deadweight welfare loss shaded in my diagram. This is a negative production externality and a market failure.

However, the size of the external costs depends on recycling rates. If increased recycling occurs, encouraged by intervention such as the plastic tax, less plastic ends up as waste and the impact on third parties falls. Taxes, as in Extract B, can internalise the external cost by raising the price of plastic to firms and consumers, moving output towards Q^*.

Private costs may also fall over time: as firms increase their scale of production they gain economies of scale, reducing the average cost of plastic packaging.

Estimating the external costs is very difficult, as it is hard to put a monetary value on damage to wildlife or the long-term effects of micro-plastics, so the exact size of the welfare loss is uncertain. In addition, much of the impact of plastic pollution can fall on other countries and economies, for example when waste is exported, so the external costs are dispersed and may not be felt in the UK.

Finally, the external costs must be weighed against the benefits of plastic production: plastic packaging protects food, reducing food waste, and the industry creates employment opportunities.

In conclusion, plastic production involves significant private costs, which firms already consider, and large external costs, which they ignore, causing overproduction. The scale of the external costs depends mainly on how much plastic is recycled rather than thrown away, and on whether taxes are set at the right level to reflect them.

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EITHER

(f) Evaluate the likely impact of a tax on plastic food-packaging. Use a diagram to support your answer.

(20)

OR

(g) Evaluate methods of government intervention which could be used to reduce the market failure associated with plastic waste. Use a diagram to support your answer.

(20)

Indicate which question you are answering by marking a cross in the box ☒. If you change your mind, put a line through the box ☒ and then indicate your new question with a cross ☒.

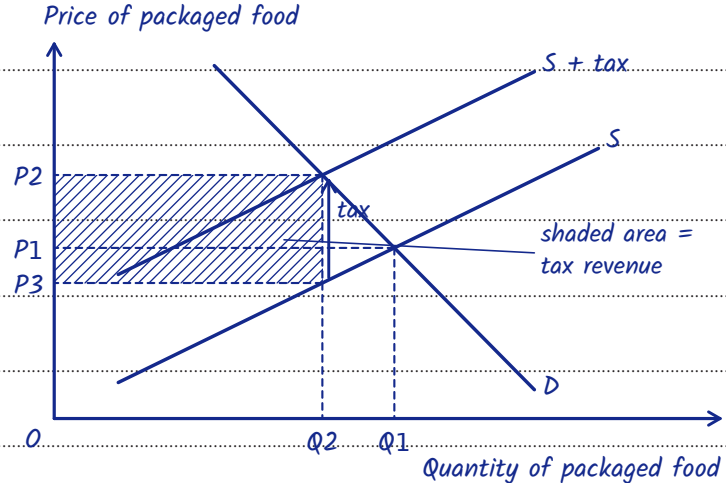
Chosen question number: **Question 6(f)** ☒ **Question 6(g)** ☒

Write your answer here:

Question 6(f)

A tax on plastic food packaging is an indirect tax which raises the costs of production for firms using non-recycled plastic. As in Extract B, firms using packaging with less than 30% recycled plastic pay £200 a tonne. In my diagram, supply shifts up by the amount of the tax from S to S + tax, so the price of packaged food rises from P1 to P2 and quantity falls from Q1 to Q2.

Firstly, the price of food is likely to increase. Food manufacturers use 40% of



packaging in the UK and warn the tax will 'force them to increase prices for consumers'. As demand for food is price inelastic, most of the incidence falls on

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consumers (P1 to P2) rather than producers (P1 to P3). Consumer surplus falls, and since low-income households spend a high proportion of income on food the tax is regressive, an unintended consequence.

Secondly, the tax creates an incentive for producers to use recycled packaging. Packaging containing more than 30% recycled plastic is exempt, so firms can avoid the tax by switching to recycled materials, reducing their costs. This acts as a shove, changing the behaviour of firms, and indirectly of consumers, as higher prices of heavily packaged food encourage them to choose products with less plastic.

Thirdly, the tax should reduce the impact upon the environment. Producing less virgin plastic reduces CO2 emissions, litter and damage to wildlife, so the negative externality is internalised and output moves towards the social optimum where MSC = MSB, reducing the welfare loss.

Finally, the government gains tax revenue, the shaded rectangle (P3 to P2 multiplied by Q2). This could be hypothecated to mitigate externalities, for example by funding litter collection, recycling facilities or subsidies for alternatives.

However, the impact depends on the price elasticity of demand for particular foods. Because demand for food is price inelastic, quantity falls only a little, so the tax may raise prices without greatly reducing plastic use; it also depends on whether firms pass the increase on or absorb it in their margins.

The impact also depends on the magnitude of the tax and its duration. £200 a tonne may be a small proportion of costs for large firms, so the level of tax may not be sufficient to change the behaviour of firms or consumers. If it is not raised over time in line with inflation, its incentive effect will fade.

Furthermore, as the extract shows, using 30% recycled plastic avoids the tax completely, so firms only need to meet this threshold; the other 70% can still be virgin plastic, and firms producing under 10 tonnes a year are exempt, limiting the

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impact. If, on the other hand, the tax is set too high, it could lead to a misallocation of resources and government failure, and non-compliance would cause increased enforcement costs, further government failure.

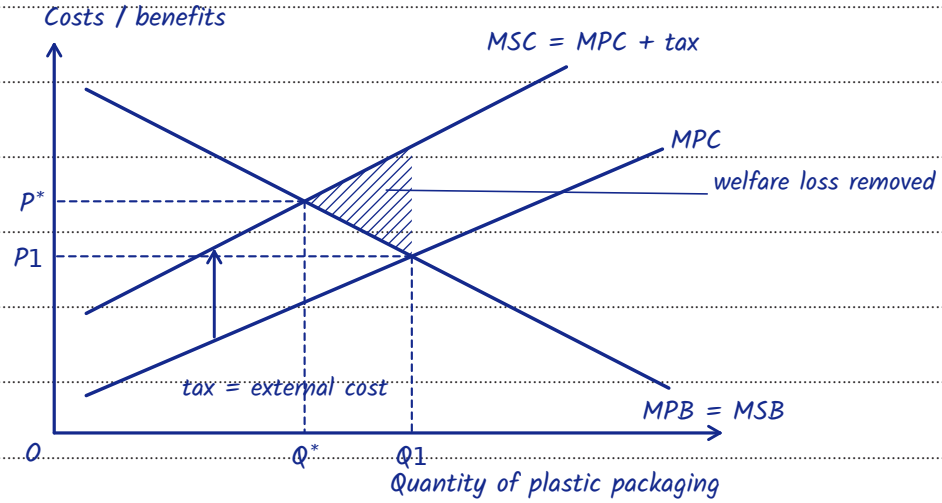
An alternative such as a subsidy for recycled or biodegradable packaging might be more effective in incentivising the use of different materials without raising food prices for poorer households, although it has an opportunity cost for the government.

In conclusion, a tax on plastic food packaging is likely to raise food prices slightly and to give firms a clear incentive to use recycled plastic, reducing the negative externality. However, the overall impact depends on the size of the tax, the PED for food and the 30% exemption, and its regressive effect means it works best alongside subsidies for alternatives.

Question 6(g)

Plastic waste causes a negative externality: firms and consumers ignore the external costs of litter, damage to wildlife and 25 000 tonnes of waste from single-use cups alone, so plastic is overproduced at Q1 rather than Q*, a market failure. There is also asymmetric information, as consumers do not know the full damage. The government can intervene in several ways.

Taxation: a tax equal to the external cost shifts MPC up to MSC, as in my



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diagram, internalising the externality. The price rises from P1 to P*, output falls to the social optimum Q* and the welfare loss is removed. The plastic packaging tax of £200 a tonne and the 10p bag charge, which cut bag purchases from 7 500 million in 2014 to 197 million in 2021, show taxes can work. Revenue can be hypothecated to fund alternatives or recycling. However, if demand is price inelastic, quantity falls only a little; the incidence falls mostly on consumers and it may be regressive. It is also hard to estimate the external cost, so the tax may be set too high or too low, leading to government failure.

Subsidies for alternatives such as recycled, biodegradable or reusable packaging lower their prices, encouraging firms to research and switch to alternatives, reducing excess production of plastic. However, subsidies have an opportunity cost, as the money could be spent on health or education, and the government may fail to provide sufficient subsidies or set them at the wrong level. Extract C shows that a discount on reusable cups had no impact at all, so price incentives alone may not work.

Information provision tackles asymmetric information by informing consumers and producers of the market failure caused by plastic waste. Posters about litter increased use of reusable cups by 2.3%, and it is relatively cheap. However, the effect is modest and slow, as consumers may ignore messages.

Regulation, such as bans on certain plastic packaging or rules requiring more recycled plastic, can remove specific plastics entirely, so it is more certain than a tax. Requiring more recycling of plastic waste would limit the externalities. A minimum price for plastic used by firms would also act as a disincentive. However, regulation involves excessive administrative and monitoring costs, it distorts price signals, and it may have unintended consequences, such as firms using substitutes like thicker 'bags for life' or paper with higher carbon footprints, or illegal dumping.

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The success of each method depends on the price elasticity of demand, the accuracy of information about external costs, and the relative costs and benefits of government intervention compared with market-based solutions. Extract C notes the greatest behavioural change came when measures were combined.

In conclusion, taxation is probably the most effective single method, as it internalises the externality and raises revenue, as shown by the fall in bag use. However, because the external costs are hard to measure, it is most effective combined with regulation, information and subsidies for alternatives, which together reduce plastic waste by more than any single measure.

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(Total for Question 6 = 60 marks)

TOTAL FOR SECTION B = 60 MARKS
TOTAL FOR PAPER = 80 MARKS

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