Please check the examination details below before entering your candidate information

Candidate surname	Other names
StemUp Model Solution	

Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Tuesday 9 May 2023

Afternoon (Time: 1 hour 45 minutes)

Paper reference **WEC11/01**

Economics

International Advanced Subsidiary
UNIT 1: Markets in action

You must have:
Source Booklet (enclosed)

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.
- Answer **ALL** questions in Sections A, B and C.
- Answer **ONE** question in Section D.
- 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 in this section.

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 ☒.

1 Which **one** of the following combinations of characteristics best describes private goods?

- ☒ **A** Rival and excludable
- ☐ **B** Rival and non-excludable
- ☐ **C** Non-rival and excludable
- ☐ **D** Non-rival and non-excludable

(Total for Question 1 = 1 mark)

2 It was estimated that the price elasticity of demand for cereals was –0.6 and for fruit it was –0.7.

Which **one** of the following factors is most likely to cause demand for a product to be price inelastic?

- ☐ **A** There are legal constraints on manufacturing the product
- ☐ **B** There are large stocks of the product available
- ☐ **C** The product has many substitutes
- ☒ **D** The product lacks substitutes

(Total for Question 2 = 1 mark)

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3 The table shows the average percentage change in the price of tickets for National Basketball Association (NBA) games and the percentage change in the quantity of tickets sold. The data compares the percentage changes between 2021 and 2022.

Average percentage change in the price of tickets for NBA games	+10.2%
Percentage change in the quantity of tickets sold at NBA games	–18.0%

Which **one** of the following can be deduced from the table?

- ☒ **A** Demand for NBA tickets is price inelastic
- ☒ **B** Demand for NBA tickets is price elastic
- ☒ **C** Demand for NBA tickets is income elastic
- ☒ **D** Demand for NBA tickets is income inelastic

(Total for Question 3 = 1 mark)

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4 In South Africa demand for electric blankets increased by 250% in 2022.

Which of the following combinations is the most likely impact on the market for electric blankets?

		Consumer surplus	Price
☒	**A**	Decrease	Decrease
☒	**B**	Decrease	Increase
☒	**C**	Increase	Increase
☒	**D**	Increase	Decrease

(Total for Question 4 = 1 mark)

5 In July 2022 Amazon, the online retailer, announced that it would increase the price of its Amazon Prime subscription service from £79 to £95 per year. This resulted in 590 000 UK consumers cancelling their Amazon Prime subscriptions.

Which **one** of the following is the most likely explanation of this behaviour?

☒ **A** These consumers experienced inertia

☒ **B** These consumers experienced habitual behaviour

☒ **C** These consumers aimed to maximise their utility

☒ **D** These consumers aimed to minimise their utility

(Total for Question 5 = 1 mark)

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6 The table shows the cross elasticities of demand for selected vehicle types with respect to the price of diesel vehicles in Norway.

Vehicles	Cross elasticity of demand
Battery electric	+0.48
Hybrid	+0.32

(Source: adapted from https://etrr.springeropen.com/articles/10.1186/s12544-020-00454-2/figures/6)

Which **one** of the following can be deduced from the table?

☒ **A** A 10% increase in the price of diesel vehicles will result in a 4.8% decrease in the quantity of battery electric vehicles demanded

☒ **B** A 10% increase in the price of diesel vehicles will result in a 0.32% increase in the quantity of hybrid vehicles demanded

☒ **C** A 5% increase in the price of diesel vehicles will result in a 3.2% decrease in the quantity of hybrid vehicles demanded

☒ **D** A 5% increase in the price of diesel vehicles will result in a 2.4% increase in the quantity of battery electric vehicles demanded

(Total for Question 6 = 1 mark)

TOTAL FOR SECTION A = 6 MARKS

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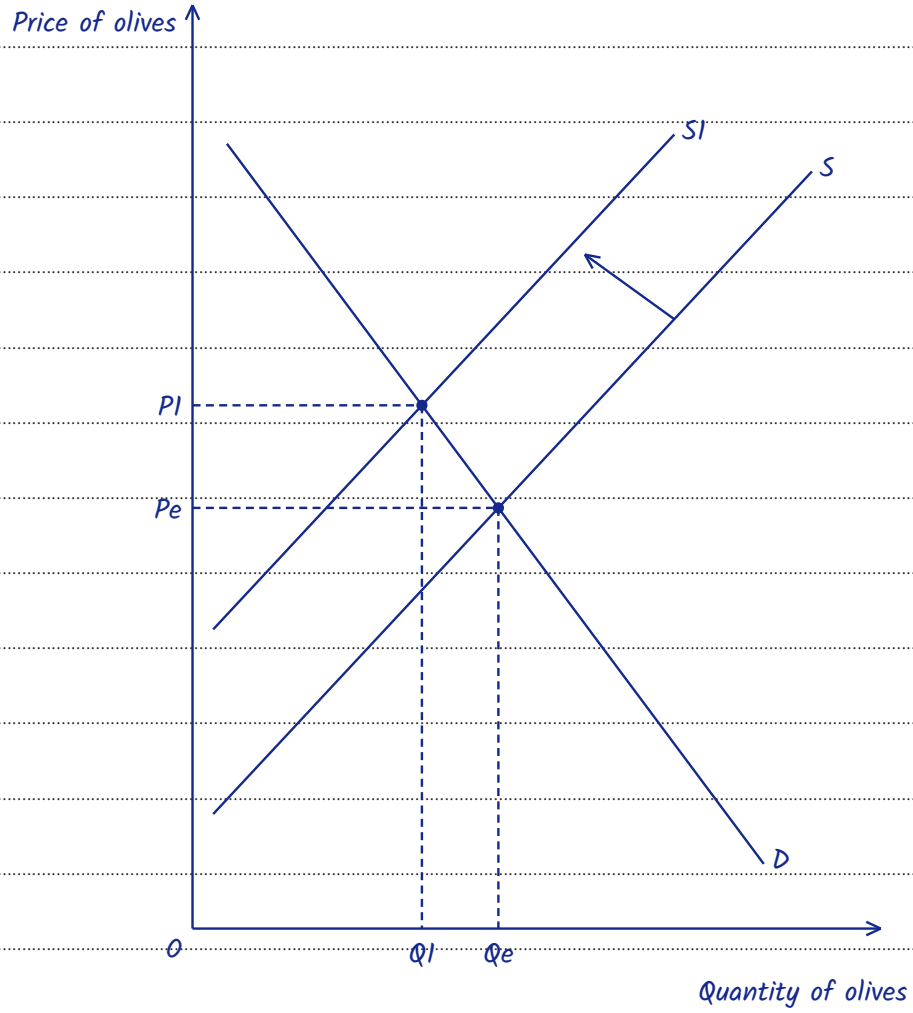
SECTION B

Answer ALL questions in this section in the space provided.

7 In 2021 Spain produced 1.4 million tonnes of olives, accounting for 50% of world production. In 2022 a prolonged heatwave in Spain resulted in its olive production falling to 1.0 million tonnes.

Draw a diagram to illustrate the likely impact of this change on the world market for olives.

(4)



The heatwave cut Spanish output from 1.4 to 1.0 million tonnes, and Spain produces 50% of world olives, so world supply shifts left from S to S1. Price rises from Pe to P1 and the quantity traded falls from Qe to Q1.

(Total for Question 7 = 4 marks)

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8 Between 1970 and 2020 the Maldives experienced 30 major flood events. One contributing factor was under-investment in flood defences.

Builders of new hotels are required to complete extensive paperwork to show how they plan to minimise flood risk. This results in excessive administrative costs.

With reference to the Maldives, explain the difference between 'market failure' and 'government failure'.

Market failure is when the price mechanism (the free market forces of supply and demand) leads to an inefficient allocation or misallocation of resources, so society's welfare is not maximised.

In the Maldives, flood defences are a public good: they are non-excludable and non-rival, so people can free ride and no private firm can charge for them. This leads to the under-investment in flood defences and the 30 major flood events between 1970 and 2020, which is market failure.

Government failure is when government intervention in a market leads to a net welfare loss, so resources are allocated worse than before the intervention.

In the Maldives, builders of new hotels must complete extensive paperwork to show how they will minimise flood risk. This creates excessive administrative costs, which raise the cost of building hotels and may reduce investment in tourism, so the intervention itself causes a welfare loss. This is government failure.

(Total for Question 8 = 4 marks)

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9 In the USA 92% of people had private health insurance in 2021. It is estimated that, in the USA, $200 billion per year is spent on unnecessary operations.

Explain **one** microeconomic reason why people might have unnecessary operations in the USA.

One reason is asymmetric information, where one economic agent has more information than another. In healthcare, the producer (the doctor or hospital) has much more information than the consumer (the patient).

Patients do not have medical training, so they cannot judge whether they actually need an operation and must rely on the doctor's advice. Doctors can use their superior knowledge to recommend operations that the patient may not need.

With 92% of people in the USA having private health insurance, the operation is paid for by the insurance company, not the patient. Each extra operation increases revenue and profit for the private health provider, so doctors have an incentive to recommend more operations, and patients are willing to accept them because they do not pay directly.

As a result resources are misallocated, with an estimated $200 billion per year spent on unnecessary operations.

(Total for Question 9 = 4 marks)

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10 The table shows average household income per month in Singapore and the total quantity of cinema tickets purchased by its citizens in 2020 and 2021.

Year	Average household income	Quantity of cinema tickets
2020	S$ 4 022	4.7 million
2021	S$ 4 166	7.6 million

(Source: adapted from https://www.statista.com/statistics/199983/us-vehicle-sales-since-1951/ and https://dqydj.com/individual-income-by-year/#:~:text=Average%20Individual%20Income%20by%20Year%20%20%20Year,%20%20%2463%2C214.03%20%2056%20more%20rows%20)

Ceteris paribus, calculate the income elasticity of demand for cinema tickets.
Show your working.

YED = % change in quantity demanded ÷ % change in income

% change in quantity demanded = (7.6 − 4.7) ÷ 4.7 × 100

= 2.9 ÷ 4.7 × 100 = 61.70%

% change in income = (4 166 − 4 022) ÷ 4 022 × 100

= 144 ÷ 4 022 × 100 = 3.58%

YED = 61.70 ÷ 3.58

= +17.23

YED is positive and greater than 1, so cinema tickets are a normal, income elastic (luxury) good in Singapore.

(Total for Question 10 = 4 marks)

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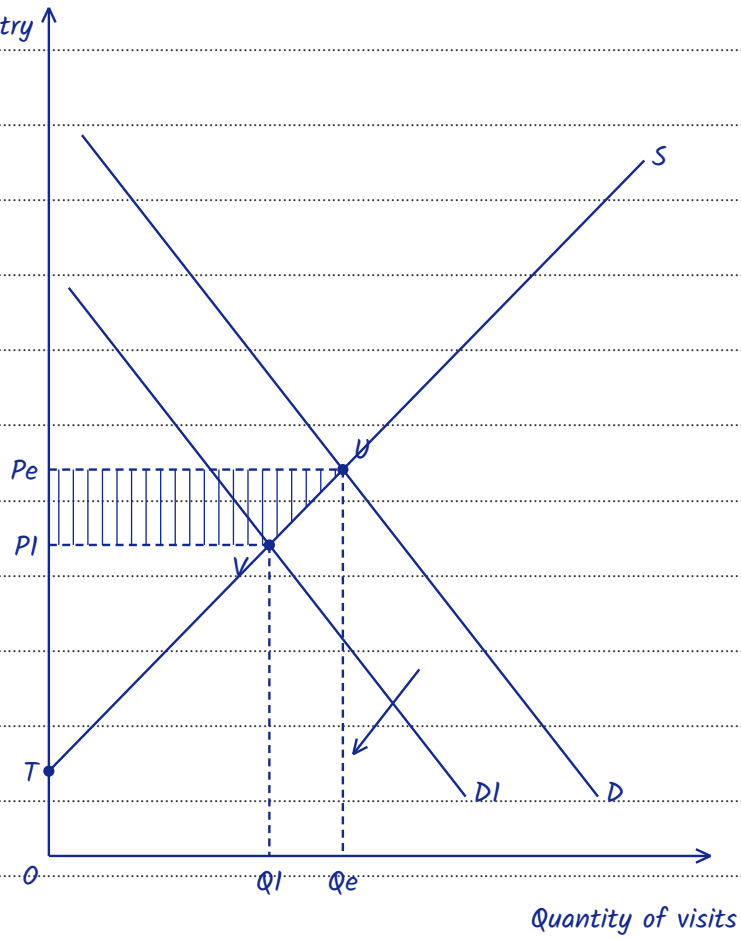
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11 In 2019 there were 15.7 million visitors to Legoland's eight theme parks globally. In 2021 this number decreased to 9.4 million.

Ceteris paribus, explain the likely impact of this decrease in visitor numbers on the producer surplus for Legoland.

Illustrate your answer with an appropriate diagram.

(4)



Producer surplus is the difference between the price a firm receives and the lowest price it is willing to accept, the area above supply and below price. Visitors fell from 15.7 to 9.4 million, so demand shifts left from D to D1. Producer surplus falls from PeUT to P1VT, a loss of the shaded area PeUVP1.

(Total for Question 11 = 4 marks)

TOTAL FOR SECTION B = 20 MARKS

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SECTION C

Study Figure 1 and Extracts A, B and C in the Source Booklet before answering Question 12.

Write your answers in the spaces provided on the following pages.

12 (a) Define the term 'supply' (Extract A, line 8).

(2)

(b) With reference to Extract A, explain **one** advantage of Apple using energy produced from renewable resources.

(4)

(c) With reference to Figure 1 and Extract B, analyse **two** reasons why the 'world price of lithium increased by 191%' (Extract B, line 2).

Illustrate your answer with a supply and demand diagram.

(6)

(d) With reference to the last paragraph of Extract C, examine **two** likely effects on smartphone manufacturers of the growth in the market for refurbished smartphones.

(8)

(e) With reference to Extract C, discuss the microeconomic effects of the increase in smartphone manufacturing between 2011 and 2021. Refer to external costs in your answer.

Illustrate your answer with an externalities diagram.

(14)

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12 (a) Define the term 'supply' (Extract A, line 8).

(2)

Supply is the quantity of a good or service that producers are willing and able to sell at each given price in a given time period, for example the global supply of renewable energy, expected to increase by 8% in 2022.

(b) With reference to Extract A, explain **one** advantage of Apple using energy produced from renewable resources.

(4)

A renewable resource is one that is naturally replenished, so it can be used again and again without running out, such as solar and wind energy.

One advantage is that renewable energy is much less polluting than energy from fossil fuels, so it reduces carbon emissions and the external costs of production. In 2020, 100% of the energy used directly by Apple came from renewable resources, for example a data centre in Denmark powered by a solar park and wind farm, and 213 of its suppliers have agreed to use only renewable energy.

Lower emissions reduce the harm to third parties from climate change, and as consumers see Apple as an environmentally friendly business, demand for its products may rise, increasing revenue.

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(c) With reference to Figure 1 and Extract B, analyse **two** reasons why the 'world price of lithium increased by 191%' (Extract B, line 2).

Illustrate your answer with a supply and demand diagram.

(6)

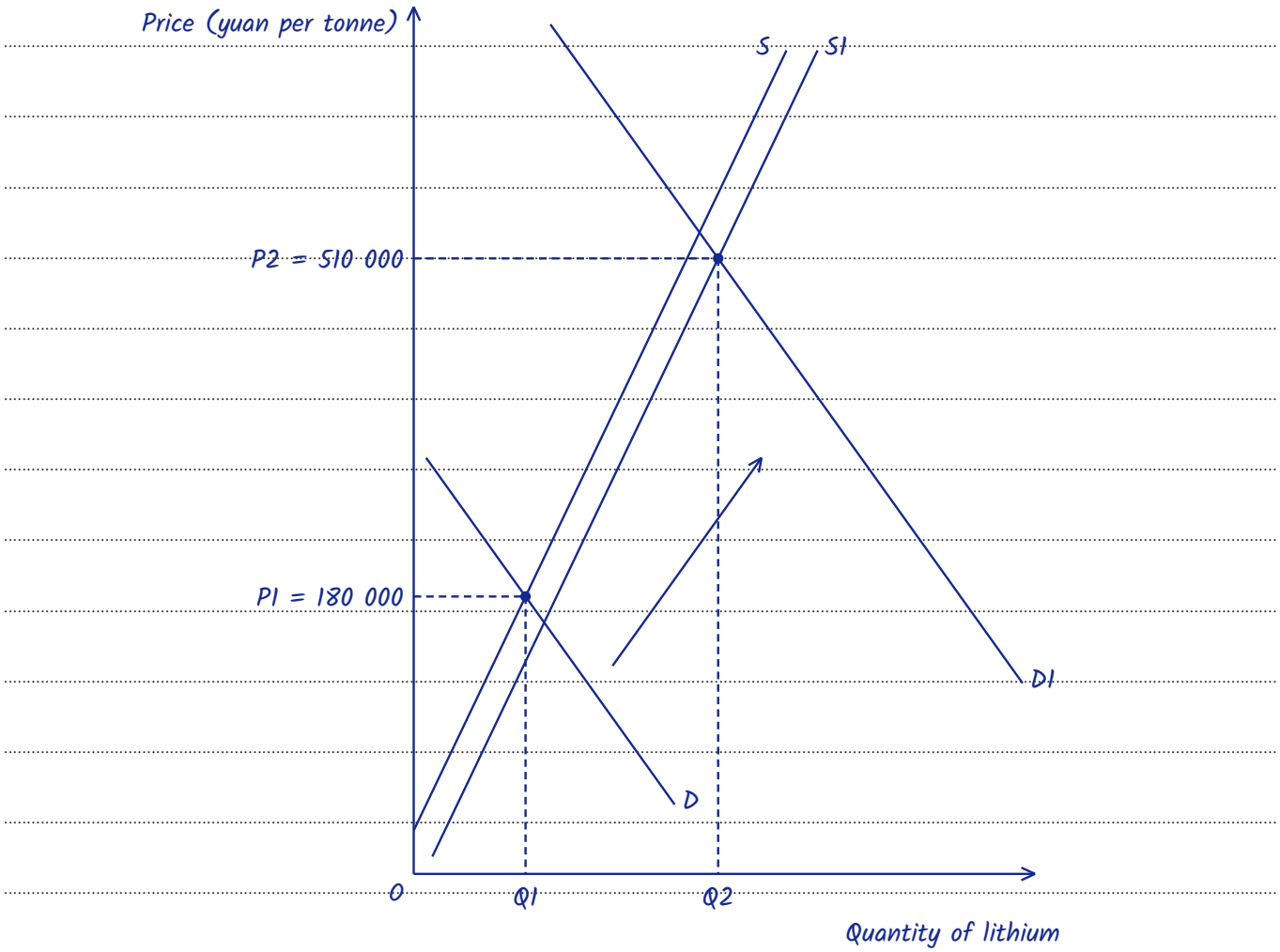


Figure 1 shows the world price of lithium rose from about 180 000 yuan per tonne in October 2021 to about 510 000 yuan in October 2022, an increase of about 330 000 yuan.

The first reason is a large increase in demand. Lithium is a derived demand: it is needed for the batteries in electric vehicles and smartphones. With rising oil prices many consumers switched from petrol and diesel cars to electric cars, and global sales of electric vehicles rose by 108% to 6.75 million in 2021 (157.5% in China). Smartphone sales, which also use lithium batteries, rose 11.4% to 1.5 billion. So demand shifted strongly right from D to D1, creating excess demand at P1 that pushed the price up.

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The second reason is that supply could not keep up. Lithium production increased by only 20%, so supply shifted right only a little from S to S1. Supply is price inelastic, because new mines take years to develop, so quantity rose only from Q1 to Q2. Because demand increased by significantly more than supply, the new equilibrium price P2 is far higher than P1, explaining the 191% rise.

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(d) With reference to the last paragraph of Extract C, examine **two** likely effects on smartphone manufacturer of the growth in the market for refurbished smartphones.

(8)

A refurbished smartphone is a used phone that has been repaired and rebuilt. The market for refurbished smartphones is forecast to be worth $65 billion by 2024.

One effect is that manufacturers lose revenue from sales of new smartphones. A refurbished phone is a close, cheaper substitute for a new one, so as the refurbished market grows, consumers substitute away from new phones. Demand for new smartphones shifts left, so manufacturers sell fewer new phones, their sales revenue falls and their profit and producer surplus decrease. Manufacturers are also producing phones that last longer, so consumers replace them less often, which adds to this fall in demand.

However, the size of this effect is uncertain. We do not know how the $65 billion compares with the revenue from selling new smartphones, so it may be small relative to a market that sold 1.5 billion phones in 2021. Many consumers may also see refurbished phones as an inferior product with reliability issues and still prefer the latest new models, so the loss of sales may be limited.

A second effect is that manufacturers can gain a new source of revenue and profit by refurbishing phones themselves. A consumer can typically sell a one-year-old smartphone for 50% of its original price, but the manufacturer can sell the same refurbished phone for 80% of its original price. By buying back used phones and refurbishing them, a manufacturer earns a margin of about 30% of the original price on each phone, so its total revenue and profit rise. Manufacturers therefore have an incentive to encourage customers to return their phones after use, and they can sell them in emerging countries, where unwanted smartphones from developed

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countries are in demand, opening up new markets.

However, the profit on refurbished phones may be lower than this margin suggests, because repairing and rebuilding phones requires a large amount of labour and parts, which raises costs. The gain also depends on manufacturers, rather than independent refurbishing firms, capturing this market, so overall the effect on manufacturers' profits may be smaller than the forecast suggests.

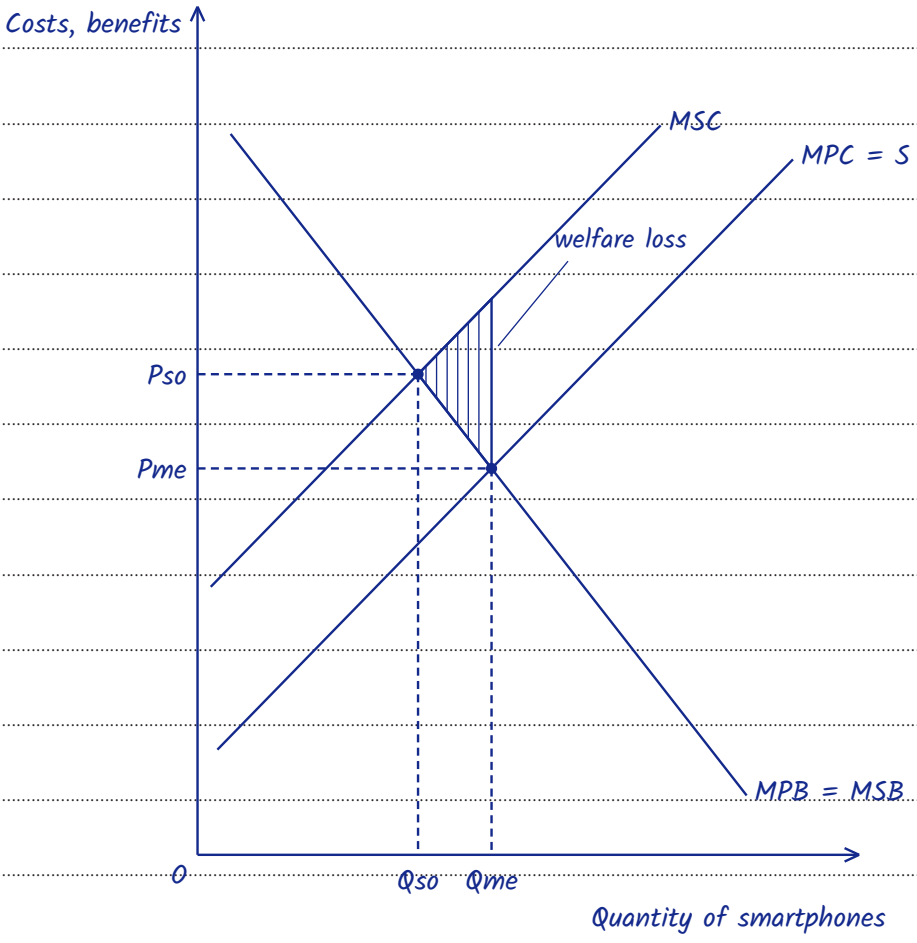
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(e) With reference to Extract C, discuss the microeconomic effects of the increase in smartphone manufacturing between 2011 and 2021. Refer to external costs in your answer.

Illustrate your answer with an externalities diagram.

(14)

External costs are the negative effects of production or consumption on third parties who are not part of the transaction and are not compensated, so the marginal social cost (MSC) is greater than the marginal private cost (MPC). Between 2011 and 2021 smartphone production increased from 472 million to 1 433 million, an increase of 961 million, or about 204%.



The diagram shows that manufacturers only consider their private costs, so they produce at Qme where MPC = MPB, at price Pme. The social optimum is Qso where MSC = MSB. Smartphones are overproduced by QsoQme and the price Pme is below the socially optimal price Pso, because it does not include the external costs. The shaded triangle is the welfare loss to society, and as

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production has trebled since 2011 this welfare loss is likely to have grown.

The first effect is higher carbon emissions. In 2022 smartphones will produce 146 million tonnes of CO_2, produced in manufacturing, transport, usage and recycling. These emissions add to global warming, which harms third parties: people living on coasts face a greater risk of flooding and farmers face droughts or floods that destroy crops and reduce their incomes.

Secondly, smartphones contain precious and rare earth metals, and mining them creates large external costs. Extracting iron, aluminium and copper produces huge amounts of liquid and solid waste: in 2015, 33 billion litres of waste spilt from an iron ore mine in Minas Gerais, Brazil. This pollutes rivers and land, which may kill fish and harm the fishing industry, destroy farmland and lower the value of nearby houses. Gold mining is also a major cause of deforestation, which reduces biodiversity and makes flooding more common.

However, the size of these external costs should be questioned. Smartphones produce only 0.5% of global carbon emissions, which is small compared with sectors such as energy and transport, although 146 million tonnes is still significant. External costs are also difficult to measure and value, and metals such as iron, gold and copper are used in many other industries, so not all the mining waste or deforestation can be blamed on smartphone manufacturing.

The external costs may also fall over time. Manufacturers are producing phones that last longer, so consumers replace them less often, and the growing refurbished market (forecast to be worth $65 billion by 2024) reduces the need to manufacture new phones and mine new metals. If manufacturers switch to renewable energy, as Apple and 213 of its suppliers have done, emissions from manufacturing will fall.

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There are also positive microeconomic effects. Higher production creates jobs and incomes, and 4.5 billion people owning a smartphone reduces information gaps, as consumers can compare prices and make more rational decisions, which gives external benefits.

Overall, the increase in smartphone manufacturing has created significant external costs from emissions and mining, causing overproduction and a welfare loss. However, the effect on emissions is relatively small in magnitude, and longer-lasting, refurbished phones and renewable energy mean the external costs are likely to be reduced in the long run.

(Total for Question 12 = 34 marks)

TOTAL FOR SECTION C = 34 MARKS

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SECTION D

Answer ONE question from this section.

Write your answer in the space provided.

EITHER

13 Commuters in Bursa, Turkey, spent an average of 82 hours in traffic congestion in 2021. This was a 75% increase compared with 2019.

Evaluate possible methods of intervention that the Turkish Government could introduce to reduce traffic congestion.

Include at least one diagram in your answer.

(Total for Question 13 = 20 marks)

OR

14 Between May 2021 and May 2022 some global commodity prices increased significantly. For example:

- fuel prices increased by 83.8%
- food prices increased by 23.6%
- beverage (drink) prices increased by 20.3%.

Evaluate possible methods of intervention that a government might use to limit the impact of increasing commodity prices.

Include at least one diagram in your answer.

(Total for Question 14 = 20 marks)

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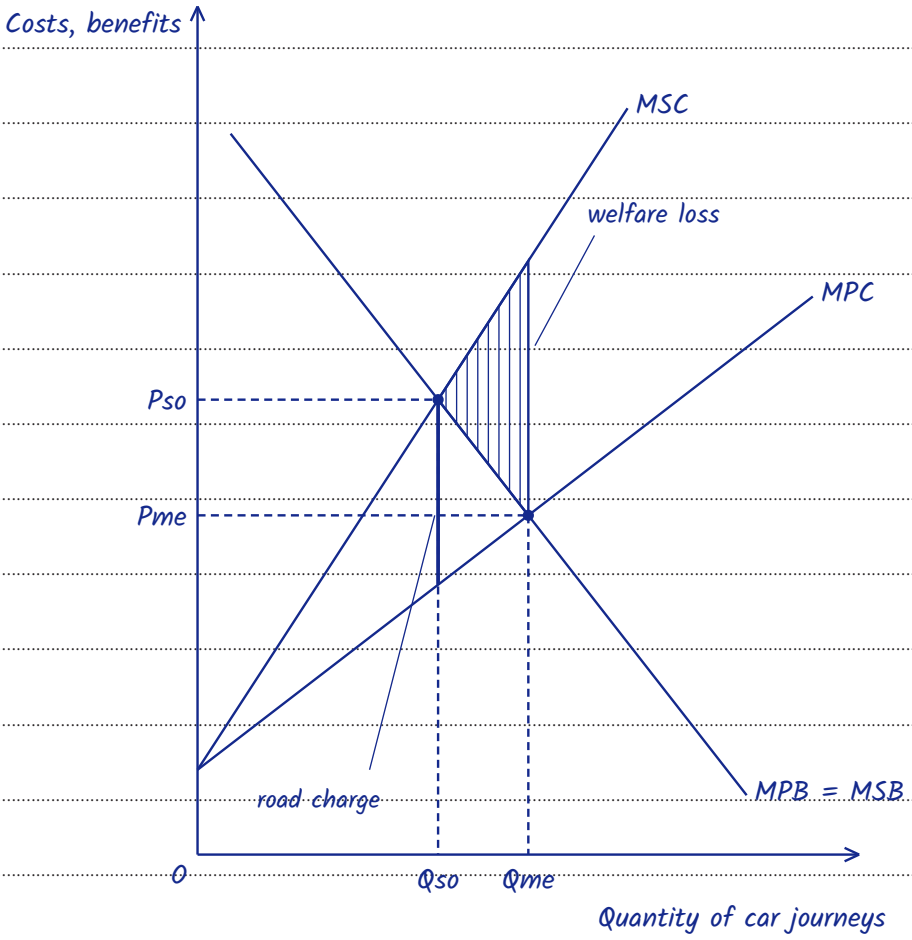
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Indicate which question you are answering by marking a cross in the box ☒. If you change your mind, put a line through the box ☒ and then indicate your new question with a cross ☒.

Chosen question number: **Question 13** ☒ **Question 14** ☐

Write your answer here:

Traffic congestion is a negative externality: each extra driver slows down other road users, causing time lost, extra fuel use and air pollution for third parties. In Bursa commuters spent 82 hours in congestion in 2021, a 75% increase from about 47 hours in 2019. Drivers only consider their marginal private cost (fuel, time), not the marginal social cost, so roads are overused and there is market failure.



Without intervention, journeys are made up to Qme where MPC = MPB, above the social optimum Qso where MSC = MSB, giving the welfare loss triangle shown.

The first method is road pricing, such as a congestion charge for driving into the centre of

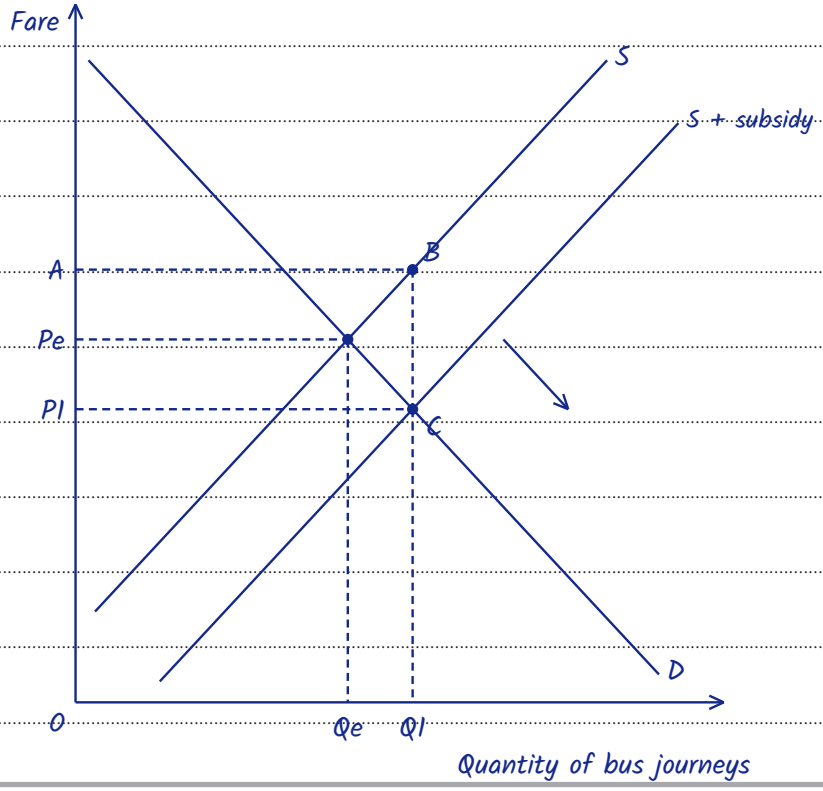
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Bursa at peak times. The charge adds to the private cost of driving, so if it is set equal to the external cost at Qso (the thick line), drivers internalise the externality. The cost of each journey rises from Pme to Pso and the number of car journeys falls from Qme to Qso, removing the welfare loss. Some commuters will switch to buses, cycling or travelling at off-peak times, which reduces congestion, and the revenue can be spent on public transport.

However, the effect depends on the level at which the charge is set and on the price elasticity of demand. For many commuters driving has few close substitutes, so demand is price inelastic and a small charge would cause only a small fall in journeys. The government also faces an information gap, as it is difficult to value the external cost, so the charge may be set too high or too low, causing government failure. Drivers may also use nearby roads without charges, simply moving the congestion, and there are high administrative costs of cameras and enforcement. Charges are also regressive, hitting low-income drivers hardest.

The second method is a subsidy to public transport such as buses, trams and trains. A subsidy is a payment from the government to producers that lowers their costs of production.



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The subsidy shifts supply right from S to S + subsidy, so fares fall from Pe to PI and the number of bus journeys rises from Qe to QI. The cost to the government is the area ABCPI. Because buses are a substitute for cars, cheaper fares reduce demand for car journeys, so fewer cars use the roads and congestion falls. One bus can replace many cars, so the effect on road space can be large.

However, the impact depends on the size of the subsidy and on cross elasticity of demand between cars and buses. If buses are slow, unreliable or do not serve commuters' routes, many drivers will not switch even at lower fares, and buses themselves still use the congested roads. The subsidy has an opportunity cost, as the money could be spent on healthcare or education, and since congestion has risen 75% in two years it may need to continue for a long time. Bus operators receiving subsidies may also become complacent and inefficient, and if the government does not know the right size of subsidy there is a risk of government failure.

A third method is regulation, such as banning cars from the city centre at peak times or only allowing cars with certain number plates on certain days. This directly limits the number of vehicles and is simple to understand, but it is a blunt policy; it ignores the different benefits drivers get from journeys and may be avoided by people buying a second car, and enforcement is costly.

The government could also spend on more road lanes or a better rail network. This increases capacity in the long run, but there is a long time lag, construction may make congestion worse while it takes place, and extra road space may simply attract more drivers. Since the global health crisis many people continue to work from home, so encouraging remote working could also reduce commuting at low cost.

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In conclusion, the most effective approach is likely to be a combination of methods. Road pricing targets the externality directly and raises revenue, but because demand for driving is inelastic it will only work well if good alternatives exist. Using the revenue from road charges to fund subsidies for buses and trams gives commuters in Bursa a cheaper substitute, making demand for car journeys more elastic and so cutting congestion by more, while limiting the opportunity cost to the government. The success of both depends on setting the charge and subsidy at the right level, which is difficult given the information gaps involved.

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TOTAL FOR SECTION D = 20 MARKS
TOTAL FOR PAPER = 80 MARKS

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Pearson Edexcel International Advanced Level

Tuesday 9 May 2023

Afternoon (Time: 1 hour 45 minutes)

Paper reference **WEC11/01**

Economics

International Advanced Subsidiary

UNIT 1: Markets in action

Source Booklet

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Sources for use with Section C

Renewables, lithium and smartphones

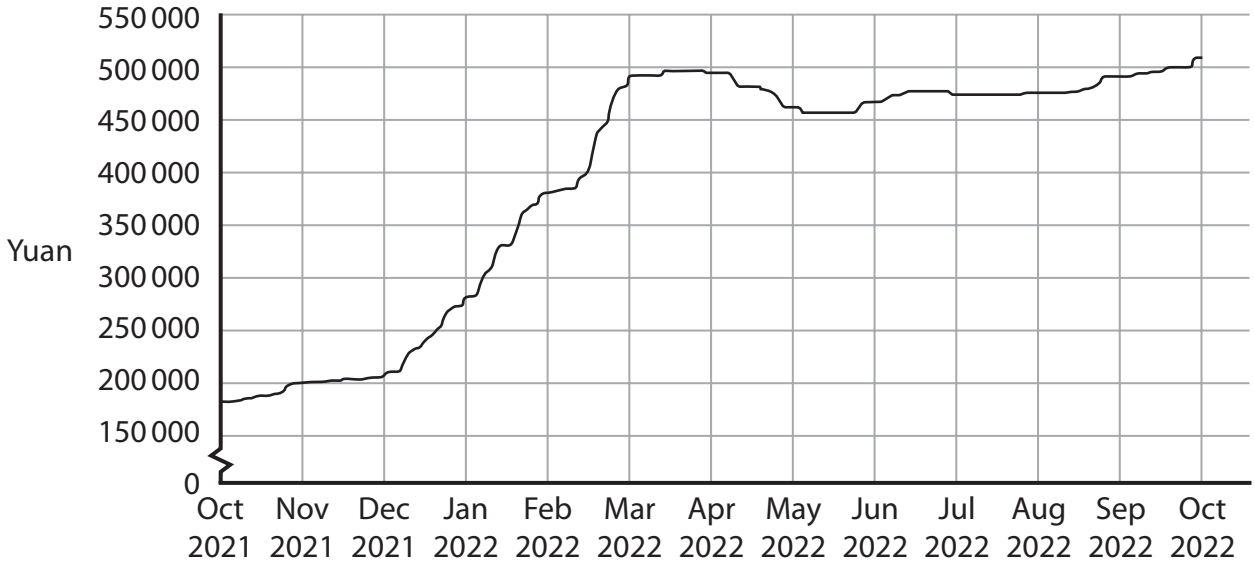
Extract A Apple's renewable commitment

In 2020 100% of the energy used directly by Apple was from renewable resources. In 2022 it announced that 213 of its suppliers had agreed to use only renewable resources to power production. Examples of Apple's commitment to renewable energy include:

- investment in a 2 300 acre solar project in Texas
- a data centre in Denmark powered by a solar park and wind farm
- Apple's supplier, Keiwa, in Japan using renewable energy from a wind farm.

The global supply of energy produced from renewable resources is expected to increase by 8% in 2022.

Figure 1 World price of lithium, yuan per tonne, October 2021 to October 2022



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Extract B Demand for lithium

Between October 2021 and October 2022 the world price of lithium increased by 191%. Lithium production increased by 20% but demand increased by significantly more.

With rising oil prices many consumers switched from petrol and diesel cars to electric cars. These electric vehicles require lithium in the batteries. In 2021 global sales of electric vehicles increased by 108% to 6.75 million and in China sales grew by 157.5%. Sales of smartphones, that also use lithium batteries, increased by 11.4% in 2021 to 1.5 billion.

Extract C Smartphone manufacturing

Between 2011 and 2021 smartphone production increased from 472 million to 1 433 million. Globally 4.5 billion people owned a smartphone by the end of 2022. In 2022 smartphones will produce 146 million tonnes of CO_2 emissions which is 0.5% of global carbon emissions. These emissions are produced in the manufacturing, transportation, usage and recycling of smartphones.

Smartphone devices contain several precious and rare earth metals. The environmental costs of mining these metals can be significant. Extracting iron, aluminium and copper produces huge amounts of liquid and solid waste. For example, in 2015 33 billion litres of waste was spilt from an iron ore mine in Minas Gerais, Brazil. In addition, mining gold is a major cause of deforestation.

Smartphone manufacturers are producing phones which last longer but are more expensive. As a result consumers do not replace their smartphones so frequently. The market for smartphones that have been refurbished* is forecast to be worth $65 billion by 2024. Typically, a consumer can sell a one-year-old smartphone for 50% of its original price. The manufacturer can sell the same refurbished smartphone for 80% of its original price. Unwanted smartphones in developed countries are desired in emerging countries.

* a refurbished smartphone is one that has been repaired and rebuilt.

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Acknowledgements

Extract A adapted from:
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Figure 1 adapted from:
https://tradingeconomics.com/commodity/lithium

Extract B adapted from:
https://finance.yahoo.com/news/lithium-prices-nearly-doubled-2022-170000490.html
https://www.ev-volumes.com

Extract C adapted from:
https://theconversation.com/three-ways-making-a-smartphone-can-harm-the-environment-102148#:~:text=Ecosystem%20destruction%20Gold%20and%20tin%20are%20common%20in,Peruvian%20Amazon%20to%20the%20tropical%20islands%20of%20Indonesia.
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