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Surname: StemUp Model Solution | Other names:

Pearson Edexcel Level 3 GCE

Centre Number | Candidate Number

Economics A

Advanced Subsidiary
Paper 1: Introduction to Markets and Market Failure

Monday 14 May 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
8EC0/01

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 **Statement 1:** Cuba has a healthcare system with a patient to doctor ratio of 155:1.

Statement 2: Other countries ought to adopt a similar healthcare system to that which exists in Cuba.

(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

(b) Cuba's population is estimated to be 11 million. With reference to Statement 1 above, calculate the estimated number of doctors in Cuba. You are advised to show your working.

(2)

Number of doctors = population ÷ number of patients per doctor

= 11,000,000 ÷ 155

= 70,967.7...

Estimated number of doctors in Cuba = 70,968 doctors (about 71,000)

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(c) Define the term 'command economy'.

(1)

A command economy is one where the government centrally plans and allocates most or all resources, deciding what, how and for whom to produce, with no or a very limited private sector.

(Total for Question 1 = 4 marks)

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2 In February 2016 the Daily Mail newspaper increased its price from 60p to 65p. By August 2016 its sales had fallen by 5.41%.

(a) Ceteris paribus, calculate the price elasticity of demand for the Daily Mail newspaper over this period. You are advised to show your working.

(2)

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

% change in price = (65p − 60p) ÷ 60p × 100 = +8.33%

% change in quantity demanded = −5.41%

PED = −5.41% ÷ +8.33% = −0.649...

PED = −0.65, so demand for the Daily Mail is price inelastic.

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(b) Which **one** of the following is most likely to be a determinant of price elasticity of demand for the Daily Mail newspaper?

(1)

- ☒ **A** Availability of rival newspapers
- ☐ **B** Change in population size
- ☐ **C** Decrease in the cost of producing the Daily Mail newspaper
- ☐ **D** Expected rise in the price of the Daily Mail newspaper

(c) Define the term 'ceteris paribus'.

(1)

Ceteris paribus means 'all other things being equal': all other factors that could affect the outcome, such as incomes or the prices of rival newspapers, are assumed to remain unchanged.

(Total for Question 2 = 4 marks)

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3 In the UK charges for dental treatment vary. For example, the following charges can be made for a tooth filling:

- National Health Service (NHS) dental treatment £50.50
- Private dental treatment £95–£700

A dentist can choose to offer NHS treatment, private treatment or both.

(a) Using the data above, which **one** of the following is a function of the price mechanism in the market for private dental care?

(1)

- ☒ **A** Acting as a signal to dentists when deciding whether to provide private dental treatment
- ☒ **B** Eliminating a shortage of private dentists by allowing the price of private treatment to fall
- ☒ **C** Encouraging government intervention to set dental care targets
- ☒ **D** Incentivising private dentists to offer only NHS treatment

(b) Explain **one** possible reason why the state provides NHS dental treatment.

(2)

One reason is inequality. Private dental treatment costs £95 to £700 for a filling, so many low-income households would be priced out of unaffordable private care and would under-consume dental treatment.

By providing NHS treatment at a lower charge of £50.50, the state ensures that people can access dental care according to need rather than ability to pay, which also creates positive externalities, as healthier people are more productive at work.

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(c) Define the term 'asymmetric information'.

(1)

Asymmetric information is where one party in a transaction has more or superior information than the other, for example a dentist knows more than the patient about what treatment is needed.

(Total for Question 3 = 4 marks)

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4 Between 2013 and 2015, median household income in the UK increased from £24 200 to £25 700. Over the same period the demand for bus travel fell by 3%.

(a) Which **one** of the following is the most accurate explanation of the term 'median household income'?

(1)

- ☐ **A** The difference between the highest level of household income and the lowest level of household income
- ☒ **B** The middle household income after placing all household incomes in numerical order
- ☐ **C** The most frequently occurring level of household income
- ☐ **D** Total household income divided by the number of households

(b) Using the data provided, explain whether bus travel is a normal good or an inferior good.

(3)

An inferior good is one where demand falls as income rises, so its income elasticity of demand is negative. YED = % change in quantity demanded ÷ % change in income.

% change in income = (£25,700 − £24,200) ÷ £24,200 × 100 = +6.2%

YED = −3% ÷ +6.2% = −0.48

As YED is negative, there is an inverse relationship between income and demand: median household income rose by 6.2% but demand for bus travel fell by 3%.

Therefore bus travel is an inferior good, as households switch to cars as their incomes rise.

(Total for Question 4 = 4 marks)

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5 The British Broadcasting Corporation (BBC) is a TV broadcaster. It is financed through an annual TV licence fee of £145.50. At this fee level many TV owners benefit from consumer surplus.

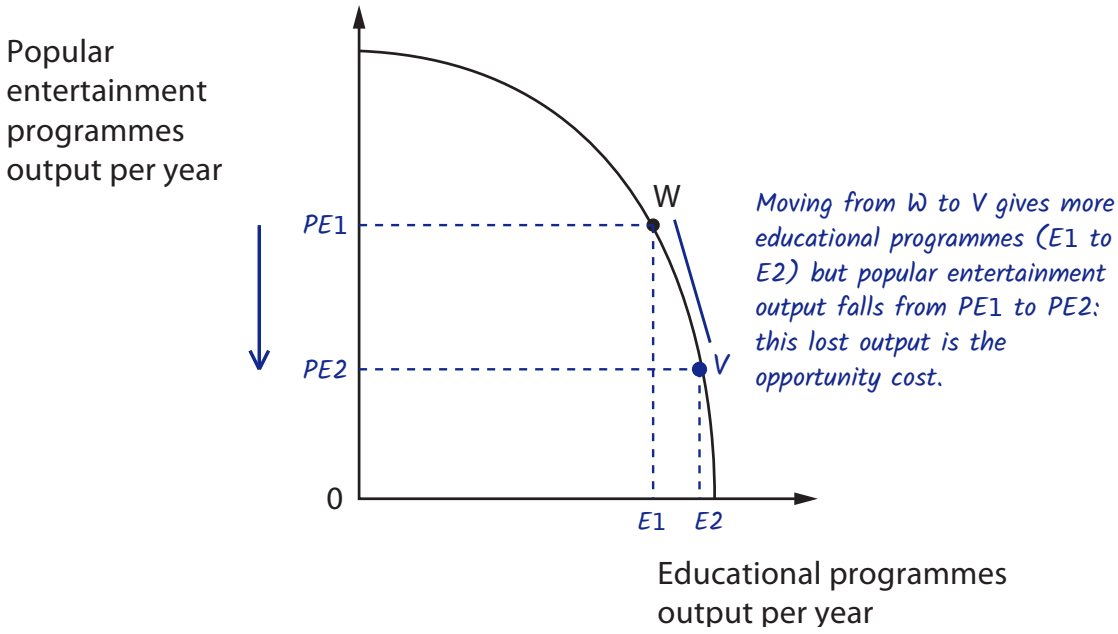
(a) Define the term 'consumer surplus'.

(1)

Consumer surplus is the difference between the total amount that consumers are willing and able to pay for a good and the total amount that they actually pay, i.e. the area below the demand curve and above the market price.

(b) The diagram shows the production possibility frontier for the BBC. Assuming the BBC is at point W, annotate the diagram to show the opportunity cost of providing more educational programmes.

(2)



(c) BBC programmes are often referred to as being public goods. This is because:

(1)

- ☐ **A** all BBC programmes are financed by the public sector
- ☐ **B** the BBC is the most popular broadcaster in the UK
- ☒ **C** the consumption of these programmes is non-rivalrous
- ☐ **D** there are external benefits from the consumption of many BBC programmes

(Total for Question 5 = 4 marks)

TOTAL FOR SECTION A = 20 MARKS

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SECTION B

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

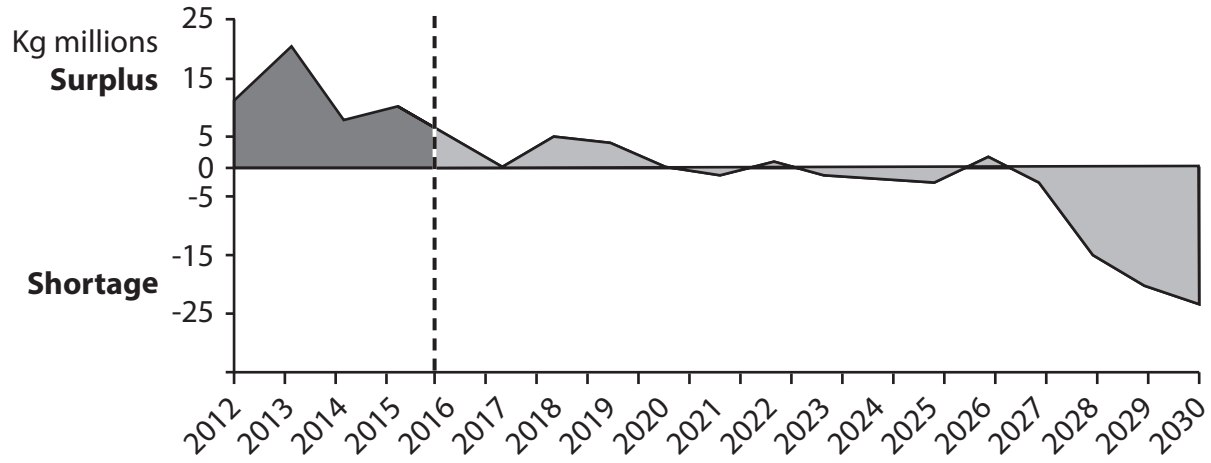
Answer ALL Questions 6(a) to 6(e) and EITHER Question 6(f) OR Question 6(g).

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

Question 6

Energy markets

Figure 1: Annual surplus or shortage of uranium, measured in millions of kilograms



Figures from 2016 are forecast

(Source: adapted from http://www.telegraph.co.uk/business/2016/11/20/uranium-the-unloved-metal-whose-price-is-poised-to-go-radioactiv/)

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Extract A

Uranium: the unloved metal

Uranium is a fuel source for nuclear energy production. The price of uranium has fallen to a 13-year low. Uranium is a relatively common metal but locating it in the right concentrations can be difficult. Australia has the biggest known resource of uranium, followed by Kazakhstan. Kazakhstan's production has increased significantly since 2007, accounting for a large proportion of the surplus of this metal. Given the large stockpiles of uranium some firms have ceased production.

The biggest impact on the uranium market has been the devastating accident at the nuclear power station in Fukushima, Japan, in 2011. The accident caused a leak of radiation. The accident reduced confidence in the entire nuclear industry, as high doses of radiation leaks increase the risk of cancer. In addition the high cost of safely storing radioactive waste has delayed the building of new nuclear power stations. Japan initially closed all of its 50 nuclear power stations which reduced the demand for uranium. But it has since concluded that nuclear power must be part of its mix of energy suppliers.

Despite this setback in 2016 work started on a new uranium mine in Spain to meet the expected rise in demand for the metal. Uranium is a controlled material, so mining companies have to comply with many regulations before opening a new mine. When it opens in 2018, this will be the only uranium mine in Europe, producing 2.2 million kilos a year. It has been in development for more than a decade.

Most developed countries, with the notable exception of Germany, have concluded that nuclear power is an essential part of their energy supply. The US and UK are committed to building new nuclear power stations, the latter providing a £30 billion subsidy to build a new nuclear plant at Hinkley Point. China is also building a further 60 nuclear power stations.

Supporters of nuclear power say it provides a reliable source of energy at a time when the world's population is increasing, unlike solar power and wind power which both vary with the weather. In addition they argue that no country can significantly reduce carbon emissions, which are causing climate change, without nuclear. France and the UK have committed themselves to shut down all coal-fired power stations by 2025. So demand for uranium over the next two decades seems guaranteed.

(Source: adapted from Uranium: the unloved metal whose price is poised to go radioactive, Jon Yeomans, The Telegraph, 20 November 2016 http://www.telegraph.co.uk/business/2016/11/20/uranium-the-unloved-metal-whose-price-is-poised-to-go-radioactiv/)

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Extract B

Irrational consumers pay the price

The UK Government has announced that it might introduce maximum price controls on energy used by households.

The UK's largest energy suppliers are braced for what could be the industry's most significant government intervention following a decade of rising energy bills and low numbers of consumers switching between energy providers.

The Prime Minister promised to intervene because the energy market is "manifestly not working" for consumers. Energy prices have risen by 158% in the last 15 years, and four million households, especially those on low incomes, are still on the most expensive energy rates.

Some energy analysts have warned the Government against taking a highly interventionist approach that could undermine the energy market and leave customers paying higher prices in the future.

(Source: adapted from http://www.telegraph.co.uk/business/2017/03/22/governments-pledge-cut-energy-prices-risks-leaving-consumers/)

Extract C

The economics of climate change

Rising carbon dioxide emissions result from the increase in the use of coal, gas and oil in transport and for energy production. In addition, deforestation, food production and processing methods make the problem worse. These carbon emissions are causing a rise in global average temperatures, known as climate change. Climate change could cause hundreds of millions of people to suffer hunger, water shortages and coastal flooding.

Three elements of policy are required for an effective global response to reduce carbon emissions. The first is the pricing of carbon, implemented through tax, trading pollution permits or regulation. The second policy is to support innovation and the deployment of low-carbon technologies. And the third is action to remove barriers to energy efficiency, and to inform, educate and persuade individuals about what they can do to respond to climate change.

(Source: adapted from www.sternreview.org.uk/)

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6 (a) With reference to Figure 1 and Extract A, explain why the price of uranium has 'fallen to a 13-year low' (Extract A, lines 2 and 3) in 2016. Include a supply and demand diagram in your answer.

(5)

(b) With reference to Extract A and your own knowledge, assess whether the supply of uranium is likely to be price elastic or price inelastic.

(10)

(c) With reference to Extract B, explain **two** likely reasons why many consumers of energy have not switched to suppliers offering lower prices.

(6)

(d) Using examples from the information provided, explain what is meant by renewable and non-renewable energy.

(4)

The UK Government is considering introducing a maximum price for energy.

(e) Discuss the likely microeconomic effects of this decision on energy producers **and** consumers. Include a supply and demand diagram in your answer.

(15)

EITHER

(f) Using the concept of external costs, evaluate whether nuclear power is under-provided or over-provided in the energy market. Use an appropriate diagram in your answer.

(20)

OR

(g) Evaluate ways in which government intervention could be used to reduce carbon emissions. Use at least one appropriate diagram in your answer.

(20)

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6 (a) With reference to Figure 1 and Extract A, explain why the price of uranium has 'fallen to a 13-year low' (Extract A, lines 2 and 3) in 2016. Include a supply and demand diagram in your answer.

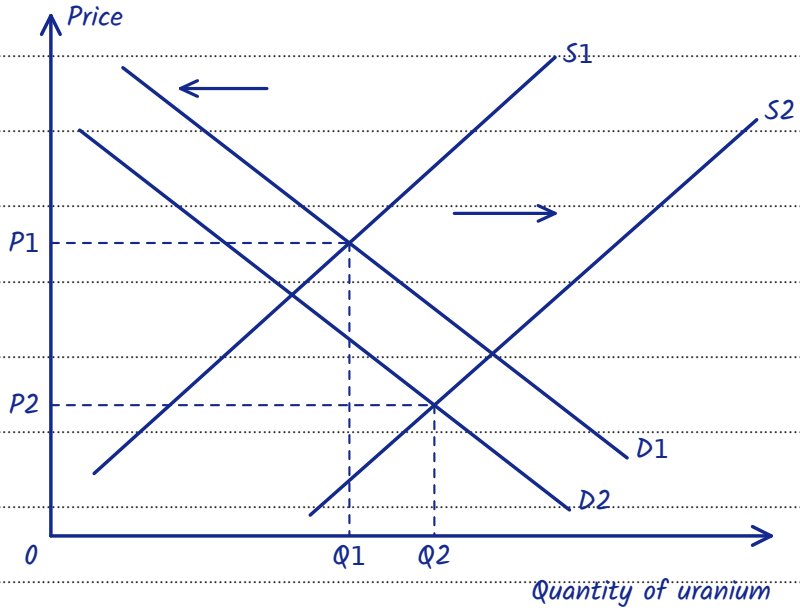
(5)

The price of uranium has fallen because supply has increased while demand has decreased, creating excess supply at the original price.

Supply has increased: Kazakhstan's production has increased significantly since 2007, accounting for a large proportion of the surplus, and there are large stockpiles. Figure 1 shows an estimated surplus of about 7 million kg of uranium in 2016, following surpluses of up to 20 million kg in 2013.

Demand has decreased: the Fukushima accident in 2011 reduced confidence in the entire nuclear industry, and Japan initially closed all 50 of its nuclear power stations, reducing the demand for uranium as a fuel.

In the diagram supply shifts right from S1 to S2 and demand shifts left from D1 to D2. At P1 there is a surplus, so the price falls to P2, a 13-year low.



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(b) With reference to Extract A and your own knowledge, assess whether the supply of uranium is likely to be price elastic or price inelastic.

(10)

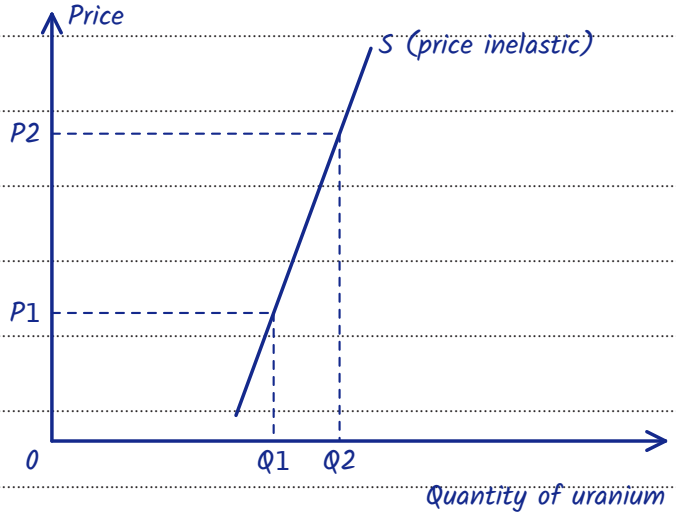
Price elasticity of supply (PES) measures the responsiveness of quantity supplied to a change in price: PES = % change in quantity supplied ÷ % change in price. Supply is price inelastic when PES is less than 1, so quantity supplied changes proportionately less than price.

There are strong reasons why the supply of uranium is price inelastic. Firstly, time: it takes many years to bring new capacity into production. Work on the new uranium mine in Spain started in 2016 but it will not open until 2018, and it has been in development for more than a decade, so producers cannot quickly raise output when price rises. Secondly, uranium is difficult to locate in the right concentrations, so finding new deposits is slow and costly. Thirdly, regulation: uranium is a controlled material, so mining companies have to comply with many regulations before opening a new mine, due to government concerns about negative externalities such as radiation. Finally, factors of production are immobile: a uranium mine and its specialist equipment cannot be switched to other uses, so resources cannot easily move in and out of uranium production as price changes.

The diagram shows a steep, price inelastic supply curve: a large rise in price from P1 to P2 causes only a small extension in quantity supplied from Q1 to Q2.

On the other hand, supply may be more price elastic than it first appears. Uranium is a relatively common metal and there are large stockpiles, with Figure 1 showing a surplus of about 7 million kg in 2016 and surpluses continuing until about 2020. Stocks can be released onto the market quickly if price rises, so supply is elastic in the short run. Some firms have ceased production, and this spare capacity could restart if price recovers. In the long run new mines, such as the one in Spain producing 2.2 million kilos a year, add capacity, so supply becomes more elastic over time.

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Overall, the supply of newly mined uranium is likely to be price inelastic because of long lead times, regulation and immobile factors. However, while stockpiles remain large, supply is fairly elastic in the short run. As Figure 1 forecasts growing shortages after about 2025, once stockpiles have run down, supply is likely to become increasingly price inelastic.

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(c) With reference to Extract B, explain **two** likely reasons why many consumers of energy have not switched to suppliers offering lower prices.

(6)

Extract B suggests that many energy consumers are irrational, so 'irrational consumers pay the price'.

The first reason is inertia. Consumers tend to stick with their existing supplier out of habit, because switching takes time and effort and many do not have the time or motivation to compare tariffs. This explains why, despite a decade of rising energy bills and prices rising by 158% in the last 15 years, there are low numbers of consumers switching between energy providers, so they continue to pay more than necessary.

The second reason is an information gap and computational problems. Energy tariffs are complex, with different unit rates, standing charges and contract lengths, so consumers find it difficult to calculate which deal is cheapest. With imperfect information and bounded rationality they cannot make a fully rational choice, which is why four million households, especially those on low incomes, are still on the most expensive energy rates. Consumers may also believe that all providers increase prices over time, so they see little gain from switching.

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(d) Using examples from the information provided, explain what is meant by renewable and non-renewable energy.

(4)

Renewable energy is produced from resources that are naturally replenished and will not run out, so they have an infinite supply. Examples from the extracts are solar power and wind power, which use energy from the sun and the wind.

Non-renewable energy is produced from finite resources which, once used, cannot be replaced. Examples are coal, gas and oil, which are fossil fuels, and nuclear power, which uses uranium, a mined metal that will eventually run out.

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The UK Government is considering introducing a maximum price for energy.

(e) Discuss the likely microeconomic effects of this decision on energy producers **and** consumers. Include a supply and demand diagram in your answer.

(15)

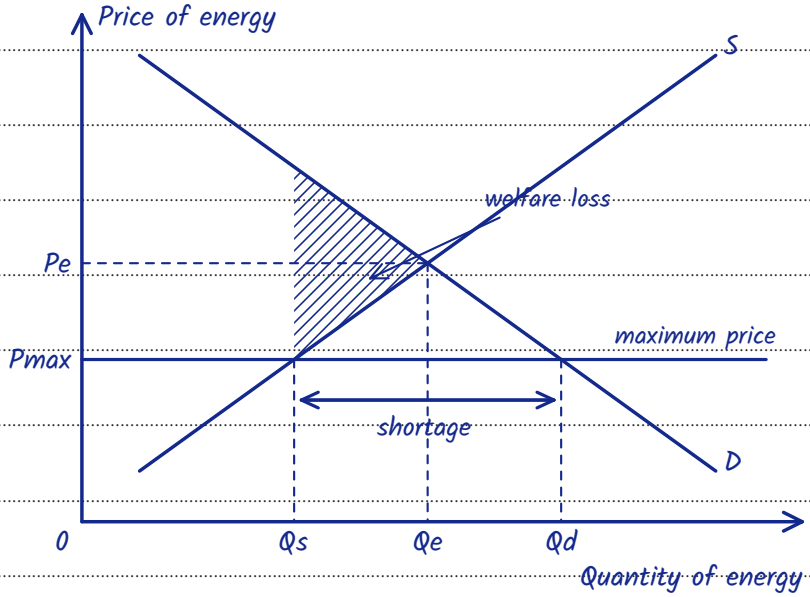
A maximum price is a legal limit on the price that can be charged, set below the free market equilibrium price, so that the price is not allowed to rise above it. The UK Government is considering this because energy prices have risen by 158% in the last 15 years.

In the diagram the free market equilibrium is at Pe and Qe. With a maximum price at Pmax, below Pe, consumers benefit because energy becomes more affordable, ending a 'decade of rising energy bills'. Quantity demanded extends from Qe to Qd. This particularly helps the four million households, especially those on low incomes, who are on the most expensive rates, reducing fuel poverty and raising their real incomes. Consumers who still obtain energy gain consumer surplus from the lower price.

For producers the lower price means a contraction in quantity supplied from Qe to Qs, as some output becomes unprofitable, for example older power stations may be turned off. Producer surplus falls, and the revenue and profits of the large energy suppliers decline. As Qd is greater than Qs, there is excess demand (a shortage) of Qs to Qd, and a deadweight welfare loss, shown by the hatched triangle, as output falls below the allocatively efficient level.

However, the size of these effects depends on how far the maximum price is set below the equilibrium price. If it is only slightly below Pe the shortage will be small and producers may still make reasonable profits, and if it is set above Pe it has no effect at all. The effects also depend on elasticities. Demand for energy is price inelastic, as it is a necessity with few substitutes, so the extension in demand will be small. Supply is also price inelastic in the short run because power stations take years to build, so the contraction in supply and the shortage may be limited in the short run but larger in

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the long run.

There may also be costs to consumers. If there are energy shortages, some consumers lose consumer surplus and may face power cuts or rationing. As analysts warn in Extract B, a highly interventionist approach could undermine the energy market and leave customers paying higher prices in the future, because lower profits reduce investment in new capacity. Producers may also move all of their tariffs up to the price cap, so cheaper deals disappear. This is an example of government failure, as the cap distorts price signals and creates unintended consequences.

In conclusion, in the short run a maximum price is likely to benefit consumers, especially low-income households, at the expense of producers' surplus and profits. In the long run, however, the benefit depends on the level of the cap and on PES: if lower profits reduce investment, shortages and higher future prices could outweigh the gains, so the cap should be set close to the equilibrium price and reviewed regularly.

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EITHER

(f) Using the concept of external costs, evaluate whether nuclear power is under-provided or over-provided in the energy market. Use an appropriate diagram in your answer.

(20)

OR

(g) Evaluate ways in which government intervention could be used to reduce carbon emissions. Use at least one appropriate diagram in 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:

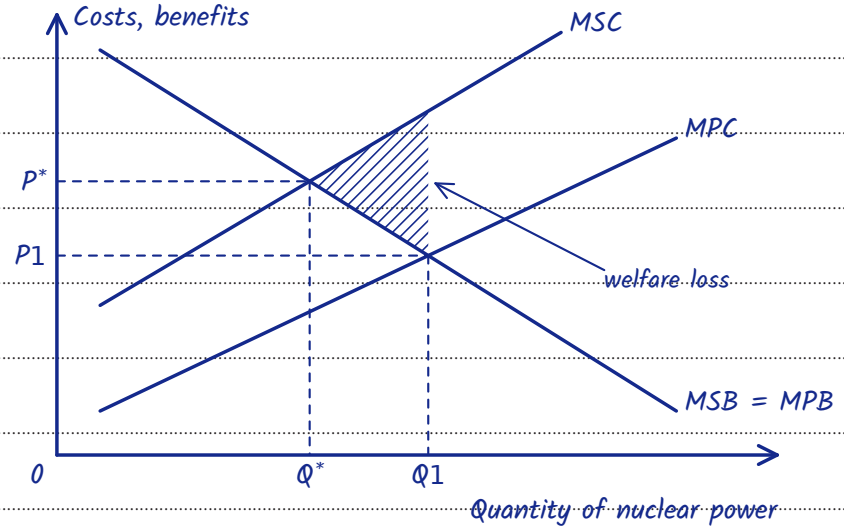
Question 6(f)

External costs are costs of production or consumption that fall on third parties not involved in the transaction and are not reflected in the market price. Marginal social cost (MSC) equals marginal private cost (MPC) plus marginal external cost. When external costs exist, the free market over-provides the good, which is a form of market failure.

Nuclear power generates significant external costs. Firstly, there is the risk of a nuclear accident, such as the devastating accident at Fukushima in 2011, which caused a leak of radiation. High doses of radiation increase the risk of cancer, leading to loss of family income and employment and costs to the NHS. Local schools and businesses may close, reducing the contribution to the local economy and property prices. Secondly, radioactive waste must be stored safely for future generations. This has a high cost and ties up land that has an opportunity cost, for example farmers lose income from land that cannot be used.

As the diagram shows, nuclear power firms only consider their private costs (MPC), so the market equilibrium is at Q1, where MPC = MSB, at price P1. The socially optimum output is Q^*, where MSC = MSB. Because Q1 is greater than Q^*, nuclear power is

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over-provided, and the units between Q* and Q1 cause a welfare loss, shown by the hatched triangle, as for these units marginal social cost exceeds marginal social benefit. The UK Government's £30 billion subsidy to build a new nuclear plant at Hinkley Point lowers costs further and worsens over-provision, and it has an opportunity cost, as the money could have supported solar businesses whose subsidies have been cut.

However, nuclear power may be under-provided when compared with the energy sources it replaces. Nuclear produces very low carbon emissions, and Extract A argues that no country can significantly reduce carbon emissions, which cause climate change, without nuclear. Extract C states that climate change could cause hundreds of millions of people to suffer hunger, water shortages and coastal flooding, so replacing coal with nuclear reduces flooding and storm damage, lowering insurance costs to businesses. With France and the UK shutting all coal-fired power stations by 2025, nuclear provides a reliable source of energy, unlike solar and wind power, which vary with the weather. Building new nuclear plants also creates local jobs, and affordable energy helps businesses stay open and reduces fuel poverty, lowering demands for health care. If these benefits are included, the social optimum may be above the market output.

The answer also depends on magnitude. Accidents like Fukushima are rare, so the expected external cost may be small compared with the continuous damage from fossil

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fuels. However, it is very difficult to measure and put a value on the risk of a catastrophic accident or on storing waste for thousands of years. In the short run building costs are high, but in the long run nuclear may provide cheap low-carbon energy, although energy efficiency measures may be a preferable way to cut emissions without these risks.

In conclusion, considering its own external costs alone, nuclear power is over-provided, especially with a £30 billion subsidy. However, compared with coal and gas, which have much larger external costs from carbon emissions, nuclear is likely to be under-provided, which is why most developed countries, except Germany, see it as essential. The judgement depends on the relative size of these external costs, which are hard to measure.

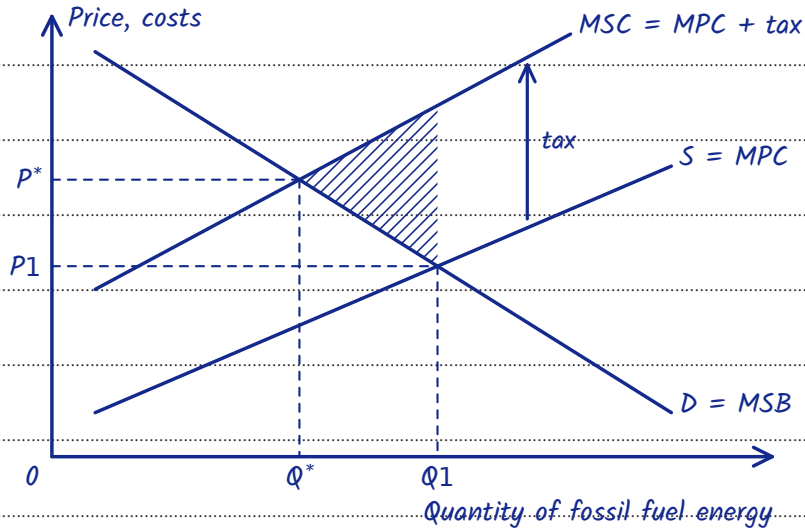
Question 6(g)

Carbon emissions from burning coal, gas and oil in transport and energy production create negative externalities: they cause climate change, imposing external costs on third parties such as hunger, water shortages and coastal flooding (Extract C). Because firms and consumers ignore these costs, the free market over-produces carbon-intensive energy, so government intervention is needed to correct this market failure.

One way is an indirect tax on carbon emissions, such as a specific tax per tonne of carbon on coal and gas power stations, or fuel duty to get people out of their cars. In the diagram the tax shifts supply up from MPC to MPC + tax. If the tax equals the marginal external cost it internalises the externality: price rises from P1 to P^*, output falls from Q1 to the social optimum Q^*, and the welfare loss (hatched) is removed.

The revenue can fund low-carbon energy. However, it is difficult to value the external cost of carbon, so the tax may be set too high or too low. Demand for energy is price inelastic, so emissions may fall only a little, and the tax is regressive, hitting low-income households hardest.

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A second way is tradable pollution permits, as in the EU Emissions Trading Scheme. The government caps total emissions and issues permits that firms can trade, so firms that can cut emissions cheaply sell permits to those that cannot, reducing emissions at the lowest cost with certainty over the total. However, if too many permits are issued their price falls and there is little incentive to cut emissions, and there are excessive administrative and monitoring costs.

Thirdly, regulation, such as the commitment by France and the UK to shut down all coal-fired power stations by 2025, or low emission zones to cut car emissions. This is simple and certain, but it gives no incentive to reduce emissions beyond the limit and needs costly enforcement.

Fourthly, subsidies for low-carbon technologies such as solar, wind and nuclear energy, cycling and public transport, like the £30 billion subsidy for Hinkley Point. These lower costs, increase supply of clean energy and support innovation, as Extract C recommends. However, they have an opportunity cost for taxpayers, solar and wind power vary with the weather, and nuclear carries risks such as accidents like Fukushima, so these are information gaps and possible government failure.

Finally, the government can provide information and remove barriers to energy efficiency, for example insulation grants and campaigns to inform, educate and persuade individuals.

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This is cheap and tackles information failure, but its effect is slow and uncertain, as consumers may ignore the advice.

All of these risk government failure through distortion of price signals, unintended consequences such as energy shortages, and administrative costs, and as climate change is global, UK action alone has a limited effect. In conclusion, carbon pricing through taxes or permits is likely to be most effective, as it uses the price mechanism to cut emissions where it is cheapest, compared with leaving it to the market. However, as Extract C argues, it works best combined with support for low-carbon innovation and energy efficiency, and its success depends on setting the right carbon price and on international cooperation.

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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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