

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

Candidate signature

I declare this is my own work.

A-level ECONOMICS

Paper 3 Economic Principles and Issues

Time allowed: 2 hours

Materials

For this paper you must have:

- the Insert
- a calculator.

Instructions

- Answer **all** questions.
- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- You will need to refer to the Insert provided to answer **Section B**.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this answer book. Cross through any work that you do not want to be marked.

Information

- The maximum mark for this paper is 80.
- The marks for questions are shown in brackets.
- No deductions will be made for wrong answers.

For Examiner's Use	
Section	Mark
A	
B	
TOTAL	



Section A

Answer **all** questions in this section.Only **one** answer per question is allowed.

For each question completely fill in the circle alongside the appropriate answer.

CORRECT METHOD



WRONG METHODS



If you want to change your answer you must cross out your original answer as shown.



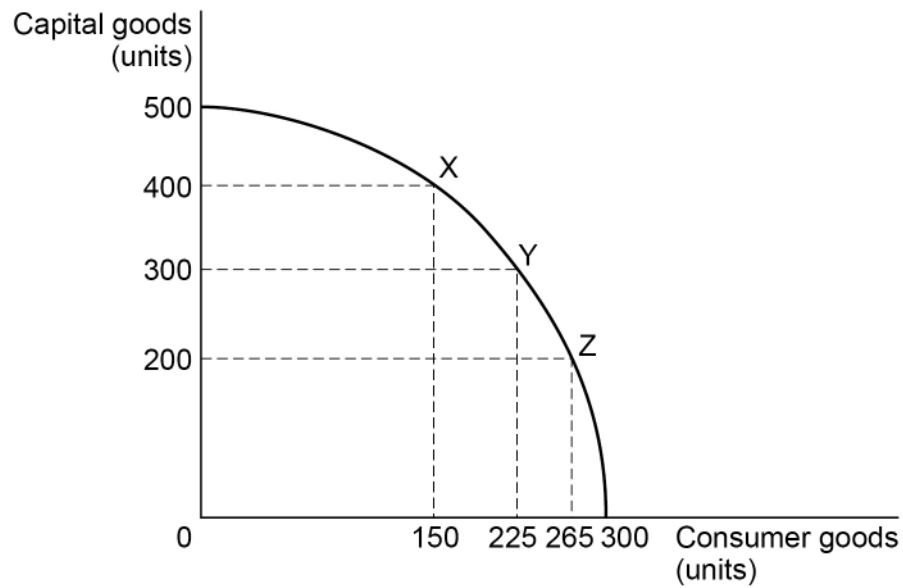
If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.

**0 1** A positive statement**[1 mark]****A** does not take into account irrational behaviour.☐**B** enables accurate forecasts to be made.☐**C** includes a value judgement.☐**D** may be true or false.☒**0 2** Which one of the following is a nudge technique that could be used to encourage healthy eating?**[1 mark]****A** Banning supermarkets from selling high-calorie energy drinks☐**B** Increasing taxes on high-fat products to raise their price☐**C** Moving products with a high sugar content away from supermarket checkouts☒**D** Subsidising fruit and vegetables to reduce their prices☐

0 3

Figure 1 shows the production possibility diagram for an economy producing capital goods and consumer goods.

Figure 1



The opportunity cost of producing an additional unit of capital goods is

[1 mark]

- A** greater at X than Y.
- B** greater at Z than Y.
- C** the same at X, Y and Z.
- D** zero when 300 units of consumer goods are produced.

☒
☐
☐
☐

Turn over for the next question

Turn over ►



0 4

Table 1 shows the individual price indices and the weightings of the three goods that make up a price index.

Table 1

Good	Weighting	Price Index in April 2022 (April 2021=100)
X	0.1	102
Y	0.4	104
Z	0.5	103

What was the percentage increase in the overall price index between April 2021 to April 2022?

[1 mark]**A** 1.1%☐**B** 3%☐**C** 3.3%☒**D** 9%☐**0 5**

When using data to make international comparisons of the standard of living, purchasing power parity (PPP) exchange rates are more useful than market exchange rates.

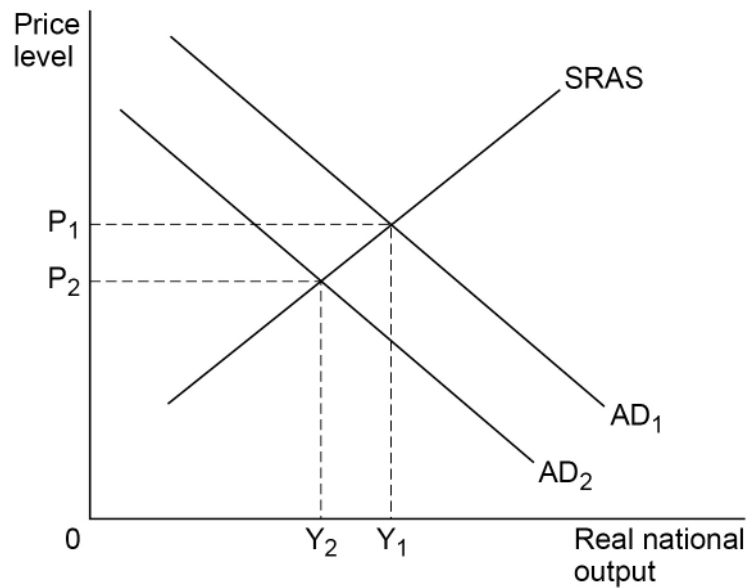
This is because PPP exchange rates take into account differences in countries'

[1 mark]**A** distribution of income.☐**B** levels of taxation.☐**C** price levels.☒**D** rates of population growth.☐

0 6

Figure 2 shows two aggregate demand (AD_1 and AD_2) curves and the short-run aggregate supply (**SRAS**) curve for an economy.

Figure 2



Which one of the following is the government most likely to increase if it wishes to use fiscal policy to reduce national output from Y_1 to Y_2 ?

[1 mark]

A Infrastructure expenditure

☐

B Interest rates

☐

C Rates of income tax

☒

D The budget deficit

☐

Turn over for the next question

Turn over ►



0 7

Which one of the following is a reason why the extension of property rights is likely to reduce market failure?

[1 mark]

A Merit goods will no longer be underconsumed in a free market.

☐

B Producers will be more likely to have to pay compensation for pollution.

☒

C Public goods will no longer be subject to the free-rider problem.

☐

D The inequality in the distribution of income and wealth will be reduced.

☐

0 8

Figure 3 shows the demand curve for a firm's scarves.

Figure 3



Which one of the following statements is true when the price of scarves is reduced from £30 to £25?

[1 mark]

A Demand for scarves is price elastic.

☐

B Price elasticity of demand is -0.5 .

☐

C The firm's total revenue falls.

☒

D The firm's total revenue increases.

☐


0 9 A firm charging different customers different prices for the same product is practising [1 mark]

- A** limit pricing. ☐
- B** marginal cost pricing. ☐
- C** price discrimination. ☒
- D** price leadership. ☐

1 0 In an economy, an index showing the change in the money supply multiplied by the velocity of circulation increases from 100 to 115.5. At the same time, the final output produced by the economy increases from 100 to 110.

According to Fisher's equation of exchange, the price level will increase by [1 mark]

- A** 5% ☒
- B** 5.5% ☐
- C** 10% ☐
- D** 15.5% ☐

1 1 Systemic risk is most likely to occur in financial systems when [1 mark]

- A** investment banks have low capital-output ratios. ☐
- B** most banks carry out both commercial and investment banking activities. ☒
- C** the central bank acts as lender of last resort to financial institutions. ☐
- D** the commercial banks have high liquidity ratios. ☐

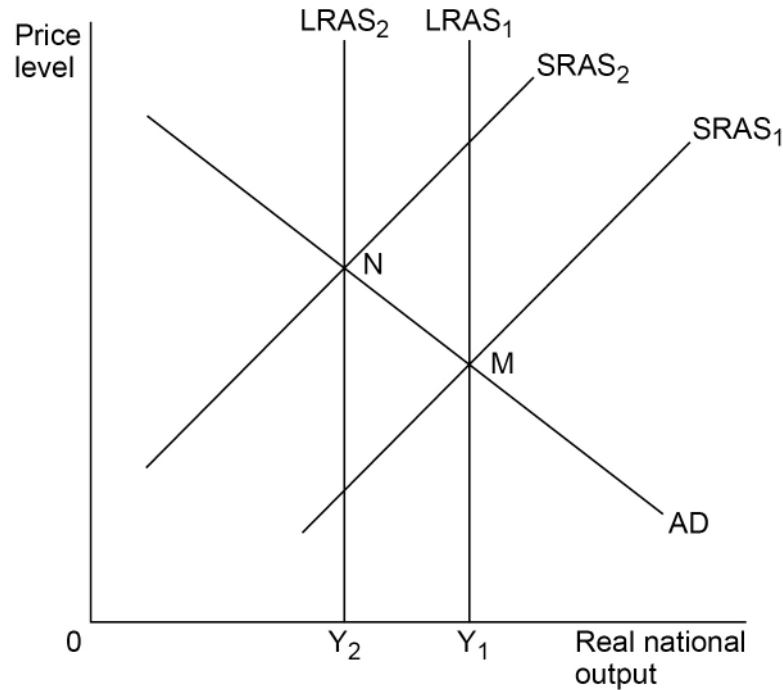
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1 2

Figure 4 shows the aggregate demand (**AD**) curve, the short-run aggregate supply (**SRAS₁** and **SRAS₂**) curves and the long-run aggregate supply (**LRAS₁** and **LRAS₂**) curves for an economy.

Figure 4



All other things being equal, which one of the following is most likely to move the economy from point **M** to point **N**?

[1 mark]

- A** A decrease in the natural rate of unemployment
- B** A loss of consumer and producer confidence
- C** A natural disaster, damaging productive capacity
- D** A rise in factor prices, resulting in cost-push inflation

☐
☐
☒
☐


1 3

Which one of the following is a role of the World Trade Organisation?

[1 mark]

- A** Helping countries settle disputes over tariffs and quotas
- B** Lending money to countries with balance of payments problems
- C** Monitoring the stability of the international monetary system
- D** Providing loans at low rates of interest to low-income countries

☒☐☐☐**1 4**

Which one of the following is a reason why the supply of cars is likely to be price elastic in the short run when the price of cars increases?

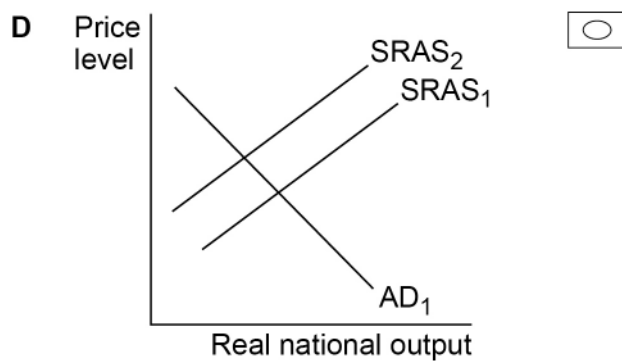
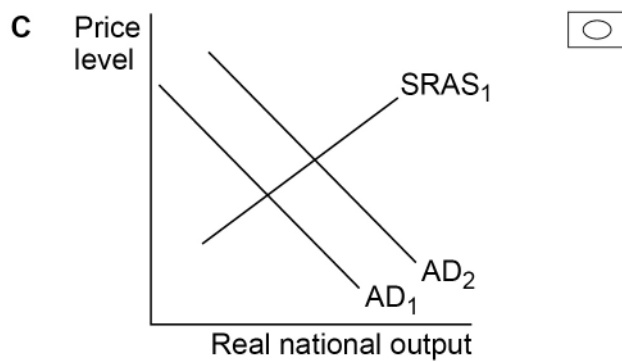
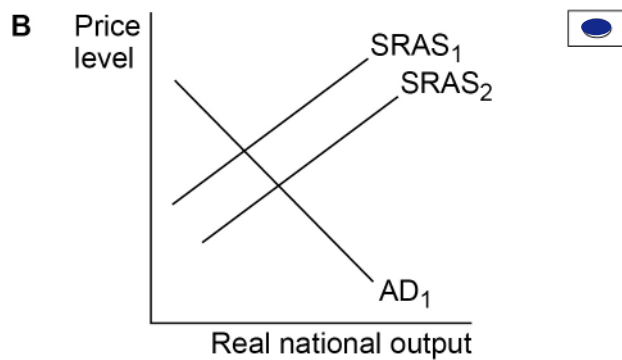
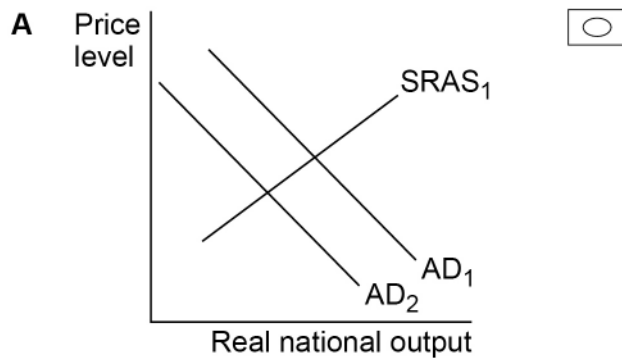
[1 mark]

- A** Car manufacturers' stocks of unsold cars are low
- B** The demand for cars is also price elastic
- C** The marginal cost of producing cars increases significantly with output
- D** There is considerable spare capacity in the car industry

☐☐☐☒**Turn over for the next question****Turn over ►**

1 5

Which one of the following diagrams, **A**, **B**, **C** or **D**, shows the most likely short-run impact on an economy of an improvement in technology in the production process?

[1 mark]

1 6

Which one of the following best explains the existence of relative poverty?

[1 mark]**A** Some households have to pay more in income tax than other households.☐**B** The Gini coefficient in some countries is low.☐**C** The income of some households is significantly less than the median household income.☒**D** The prices of items that are essential for life differ between countries.☐**1 7****Table 2** shows the amount paid in tax by individuals at different levels of income.**Table 2**

Income (£)	Tax paid (£)
20 000	4 000
30 000	5 400
40 000	6 400
50 000	7 000

This tax is an example of a

[1 mark]**A** lump sum tax.☐**B** progressive tax.☐**C** proportional tax.☐**D** regressive tax.☒**Turn over ►**

1 8

Which one of the following is a supply-side policy aimed at reducing the natural rate of unemployment?

[1 mark]

A Government retraining schemes for structurally unemployed workers

☒

B Increasing legal protection against unfair dismissal for employees

☐

C Increasing the real value of the national minimum wage

☐

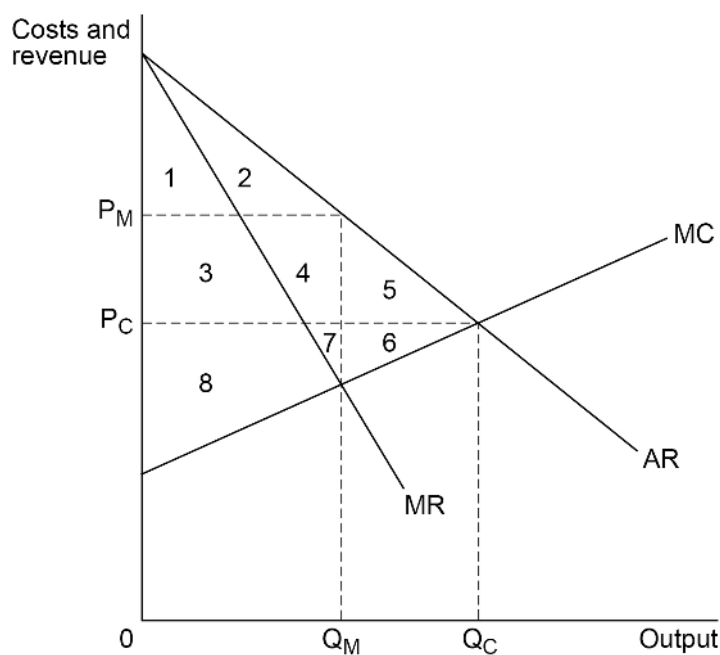
D New government subsidies for developers of artificial intelligence

☐

1 9

Figure 5 shows the average revenue (**AR**), marginal revenue (**MR**) and marginal cost (**MC**) curves for an industry which was perfectly competitive but is now a monopoly. The cost and revenue curves remain unchanged.

Figure 5



Which of the following areas shows the total deadweight loss of consumer and producer surplus resulting from the structure of the industry changing from perfect competition to monopoly?

[1 mark]

A 1 + 2

☐

B 3 + 4

☐

C 5 + 6

☒

D 7 + 8

☐


2 0

There is a reduction in the market demand for the product supplied by firms operating in a perfectly competitive industry.

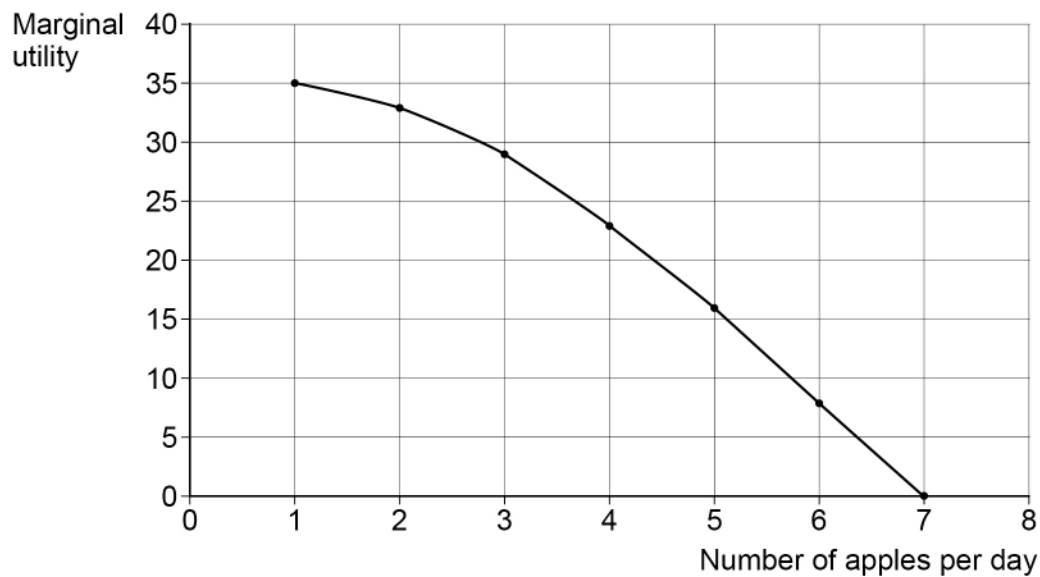
All other things being equal, which one of the following will happen to firms' average and marginal revenue as a result of this change?

[1 mark]

- A** Average revenue and marginal revenue will both fall.
- B** Average revenue and marginal revenue will not change.
- C** Average revenue will fall and marginal revenue will increase.
- D** Average revenue will increase and marginal revenue will fall.

☒☐☐☐**2 1**

Figure 6 shows the marginal utility that a consumer gains from eating apples.

Figure 6

When 7 apples per day are consumed

[1 mark]

- A** average utility is maximised.
- B** marginal utility is maximised.
- C** opportunity cost is minimised.
- D** total utility is maximised.

☐☐☐☒**Turn over ►**

2 2**Table 3** shows different combinations of performance for three macroeconomic indicators.Which one of the combinations, **A**, **B**, **C** or **D**, is most likely to indicate an economy experiencing an economic boom?**[1 mark]****Table 3**

	Imports	Price level	Job vacancies	
A	Decreasing	Increasing	Decreasing	☐
B	Decreasing	Decreasing	Increasing	☐
C	Increasing	Increasing	Increasing	☒
D	Increasing	Decreasing	Decreasing	☐

2 3**Table 4** shows the values of nominal GDP and a price index in two different years.**Table 4**

Year	2015	2019
Nominal GDP (£ billions)	250	290
Price index	100	110

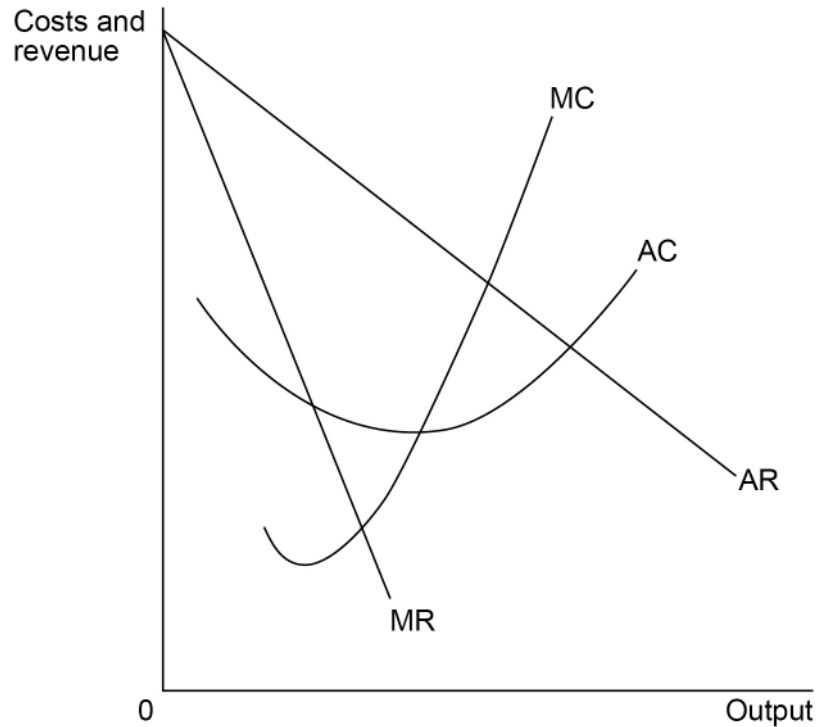
What was the value of real GDP in 2019, to the nearest £ billion, expressed in 2015 prices?

[1 mark]**A** £227 billion☐**B** £261 billion☐**C** £264 billion☒**D** £319 billion☐

2 4

Figure 7 shows the average revenue and marginal revenue (**AR** and **MR**) curves and the average cost and marginal cost (**AC** and **MC**) curves for a firm in monopolistic competition in the short run.

Figure 7



At the profit maximising price and output the firm will

[1 mark]

- A** make supernormal profits.
- B** produce the allocatively efficient output.
- C** produce where average revenue = average cost.
- D** set price equal to minimum average costs.



Turn over for the next question

Turn over ►



2 5

The price of a government bond was £10 000 when it was issued. The bond does not have a maturity date and the government is not intending to buy back the bond. The bond pays £200 per year to the bond holder and has a market price of £8 000.

Which one of the following fractions represents the yield on the bond?

[1 mark]

A $\frac{1}{50}$

☐

B $\frac{1}{40}$

☒

C $\frac{1}{5}$

☐

D $\frac{4}{5}$

☐

2 6 Table 5 contains figures from the balance sheet of a commercial bank.

Table 5

Item	Value (£ bn)
Cash	45
Share capital	100
Loans advanced	135
Fixed assets	115
Long-term liabilities	85
Investments	50
Reserves (retained profit)	30
Balances at the central bank	25
Deposits and other liabilities	185
Other liquid assets	30

What is the value of this bank's total liquid assets?

[1 mark]

A £70 bn

☐

B £100 bn

☒

C £130 bn

☐

D £175 bn

☐

Turn over for the next question

Turn over ►



2 7

Changing patterns of consumption have meant that summer holidays at UK seaside towns have become less popular. As a result, UK seaside holiday towns are affected by seasonal unemployment and increasing structural unemployment.

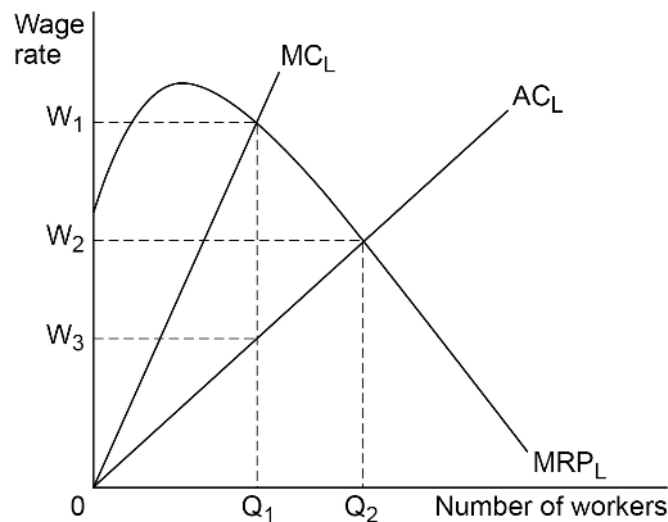
Which one of the following is the most likely consequence of this change in the pattern of consumption?

[1 mark]

- A** Occupational immobility of labour will help to reduce structural unemployment. ☐
- B** The cost of living for people who live in UK seaside towns will fall. ☒
- C** Unemployment is likely to be higher in the summer than the winter. ☐
- D** Wages in UK seaside towns will rise because firms want to retain workers. ☐

2 8

Figure 8 shows the marginal cost (MC_L), average cost (AC_L) and marginal revenue product (MRP_L) curves for labour in a specialised computer programming industry.

Figure 8

Following a series of mergers between firms in this industry, a single large firm remains as a monopsony employer.

Which one of the following is the most likely to result from a competitive labour market being replaced by a monopsony employer?

[1 mark]

- A** The total amount paid in wages will fall from $(W_2 \times Q_2)$ to $(W_3 \times Q_1)$. ☒
- B** The total amount paid in wages will increase from $(W_3 \times Q_1)$ to $(W_1 \times Q_1)$. ☐
- C** The wage rate will fall from W_1 to W_2 . ☐
- D** The wage rate will increase from W_3 to W_2 . ☐



2 9

Table 6 shows the value of the UK's Human Development Index (HDI) over the period 2015 to 2019.

Table 6

Year	2015	2016	2017	2018	2019
UK HDI Value	0.916	0.918	0.919	0.920	0.932

All other things being equal, which one of the following is most likely to explain the trend shown in **Table 6**?

[1 mark]

A A fall in the sterling exchange rate

☐

B Falling emissions of greenhouse gases

☐

C Increasing life expectancy at birth

☒

D Reductions in income inequality

☐
3 0

Unemployed workers in the south of a country are unable to take up jobs in the north of the country due to higher housing costs. This is an example of

[1 mark]

A cyclical unemployment.

☐

B frictional unemployment.

☐

C geographical immobility of labour.

☒

D occupational immobility of labour.

☐
30**Turn over for Section B****Turn over ►**

Section B

Answer **all** questions in this section.

Refer to the Insert for Extracts A, B, C and D.

Total for this Investigation: 50 marks

The commercial aircraft manufacturing industry

INVESTIGATION

Scenario

You are an economist working for an organisation that is investigating the commercial aircraft manufacturing industry.

You have been asked to review the changes to the industry that have taken place since 2014.

As part of this investigation, you are to provide answers to three questions.

Referring to the Insert, study **Extracts A, B and C**, and then use these and your knowledge of economics to help you answer Questions 31 and 32. There is also a news report, **Extract D**, which is to be used with the other extracts to help you answer Question 33.

3 1

To what extent do the data support the view that Boeing has been more successful than Airbus since 2014? You must use the data in **Extract B** to support your assessment.

[10 marks]

Boeing and Airbus operate in an oligopoly, in fact close to a duopoly, since

together they account for 99% of orders for large aeroplanes (Extract A).

Success can be judged using several criteria: the number of aircraft

delivered, market share, the backlog of orders, total revenue and profitability.

On most of these Boeing was ahead in absolute terms between 2014 and

2018, but the trend clearly favours Airbus.

Deliveries: Boeing delivered more aircraft than Airbus in every year from

2014 to 2018, 3802 in total compared with 3470, a difference of 332.

However, the gap narrowed from 94 aircraft in 2014 (723 against 629) to

just 6 in 2018 (806 against 800), because Airbus's deliveries rose by about

27.2% while Boeing's rose by only 11.5%. In 2019 Airbus delivered 863



aircraft while Boeing's deliveries fell to 380, although this was mainly due to the grounding of the 737 MAX. Airbus also had a much larger backlog of orders in 2018, 7133 compared with 5488, which points to stronger future sales.

Market share: Boeing had the larger share of deliveries in every year, but its share fell from 47.3% to 45.7% (1.6 percentage points) whereas Airbus's share rose from 41.1% to 45.4% (4.3 percentage points). By 2018 the two firms were almost level, so Airbus appears to be gaining ground at Boeing's expense.

Revenue and profit: Boeing's total revenue was higher every year, \$304.1 billion over 2014 to 2018 compared with \$275.9 billion for Airbus. Boeing's profit margin before interest and tax was also higher in every year, rising from 10.7% to 13.0%, while Airbus's rose from 6.3% to 9.0%. Multiplying revenue by margin, Boeing's estimated profit was about \$7.9 billion in 2018 compared with \$5.1 billion for Airbus, and about \$26.9 billion over the five years compared with about \$15.9 billion. The gap in margins narrowed only slightly, from 4.4 to 4.0 percentage points, so on profitability Boeing was clearly more successful. However, average revenue per aircraft fell for both firms: by \$7.7 million for Boeing (\$83.0m to \$75.3m) but by \$18.5 million for Airbus (\$89.3m to \$70.8m). This may mean Airbus cut prices to win sales, or simply that it sold a larger share of cheaper narrow-bodied aircraft. Limitations of the data: profit margins are before interest and tax, so they ignore differences in debt and interest costs, and total profit is not given and has to be estimated. There is no information on R&D spending, investment in human capital, or performance in different segments (narrow-bodied and wide-bodied) and regions. The reasons for the fall in revenue per aircraft are unknown. Most of the data stop in 2018, and the

Turn over ►



737 MAX grounding is a one-off distortion whose long-run significance is hard to judge, since the plane was cleared to fly at the end of 2020 and Ryanair has since ordered 75 more (Extract C). Five years is also a short period for an industry with very long product cycles.

Conclusion: the data support the view that Boeing was more successful than Airbus between 2014 and 2018, since it delivered more aircraft, held a larger market share and earned more revenue and profit in every year. However, its lead on volume measures was small and shrinking, Airbus's performance improved relative to Boeing's on almost every indicator, and by 2019 Airbus had overtaken Boeing in deliveries and held a far larger order book.

Therefore the view is only partly supported: Boeing was more successful in terms of revenue and profitability, but Airbus has been catching up and, since 2018, appears to have been the more successful firm.



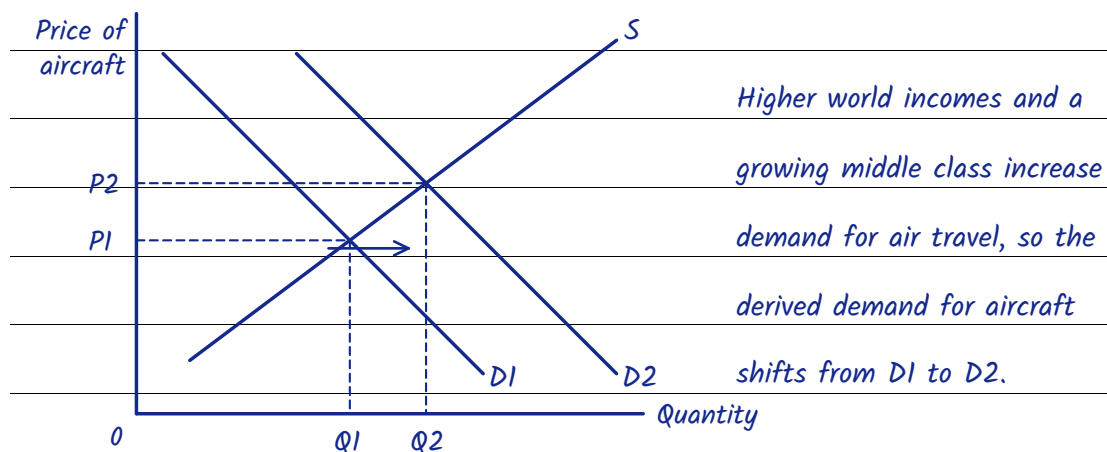
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3 2

Explain the factors that a commercial aircraft manufacturer, such as Boeing or Airbus, should consider when forecasting the future sales of its aircraft.

[15 marks]

A sales forecast is a prediction of future sales based on the expected path of the factors that determine demand. Aircraft are ordered years before delivery, so forecasts are vital for planning capacity, investment and R&D, but they are always uncertain.



Derived demand and world incomes: the demand for aircraft is a derived demand, arising from the demand for passenger and freight air transport, so a manufacturer must first forecast the growth of air travel. This depends mainly on the growth of world GDP and household incomes. Air travel has a high income elasticity of demand (YED greater than 1), so as incomes rise the demand for flights rises more than proportionately: since 2000 air traffic has grown by 240%, faster than world GDP (Extract A). The middle-class population is expected to rise from 3.9 billion to 5.9 billion over the next 20 years (Extract C), mostly in emerging economies such as China and India, increasing demand for tourism and business travel. As shown in the diagram, this shifts the demand for aircraft from $D1$ to $D2$ and raises sales from $Q1$ to $Q2$.

The economic cycle and shocks: because YED is high, demand for air travel



is very sensitive to the economic cycle. In a recession, falling incomes and confidence lead airlines to cancel or defer orders. The accelerator effect magnifies this: airlines' investment in new aircraft depends on the rate of change of passenger numbers, so a small slowdown in the growth of air travel can cause a large fall in orders. The industry is also vulnerable to shocks such as the 2008 financial crisis and the pandemic, the largest demand-side shock it has faced (Extract C). The speed of recovery will depend on consumer confidence and world growth, and narrow-bodied sales are expected to recover before wide-bodied sales, so forecasts should be made separately for each market segment and type of aircraft the company sells.

Replacement demand and technology: a large part of demand comes from replacing ageing aircraft. Airlines delayed the retirement of older aeroplanes to cope with 6.5% annual passenger growth, so many now need replacing.

New aircraft are quieter and use less fuel per seat, for example the A321XLR uses 30% less fuel per seat than previous-generation rivals, which lowers airlines' operating costs per seat. Environmental pressures and government policies, such as carbon pricing and noise and emission standards, add to the incentive to replace less fuel-efficient planes.

Price, competition and elasticities: as an oligopoly, the firm must consider the price of its aircraft relative to its rival's and how the rival will react.

Boeing and Airbus aircraft are close substitutes, so cross elasticity of demand is high and positive: if Airbus cuts its prices or offers discounts, as Boeing did to win Ryanair's order for 75 planes, the other firm's sales fall.

The price elasticity of demand for its own aircraft also matters when deciding whether discounting will raise revenue. The firm must also allow for new entrants such as the state-owned COMAC, the world's fifth largest

Turn over ►



manufacturer, and for Embraer and Bombardier, which could take market share. Non-price factors such as fuel efficiency, cost per seat and the safety record of its aircraft compared with competitors are equally important, as the 737 MAX grounding showed.

Exchange rates and government policy: aircraft are priced in dollars, so changes in exchange rates alter the price to foreign airlines and their relative competitiveness. For example, an appreciation of the dollar makes aircraft more expensive for airlines earning revenue in other currencies, reducing demand, while Airbus, with costs in euros, gains a cost advantage. Trade disputes also matter: after the WTO ruling, tariffs could be imposed on each other's goods, raising prices in the US and EU markets.

Air freight and globalisation: demand also comes from cargo airlines. Air freight carries only 1% of goods by weight but about 35% of the value of world trade, and the air cargo market is expected to grow by about 4% a year for 20 years (Extract C). Forecasts must therefore consider expected changes in globalisation, the pattern of world trade and the growth of e-commerce.

In summary, the manufacturer should combine forecasts of world economic growth, the cycle, replacement needs, technology, relative prices, competition, exchange rates and government policy, and should produce a range of scenarios because unexpected events can quickly make any single forecast wrong.



[illegible]

3 3

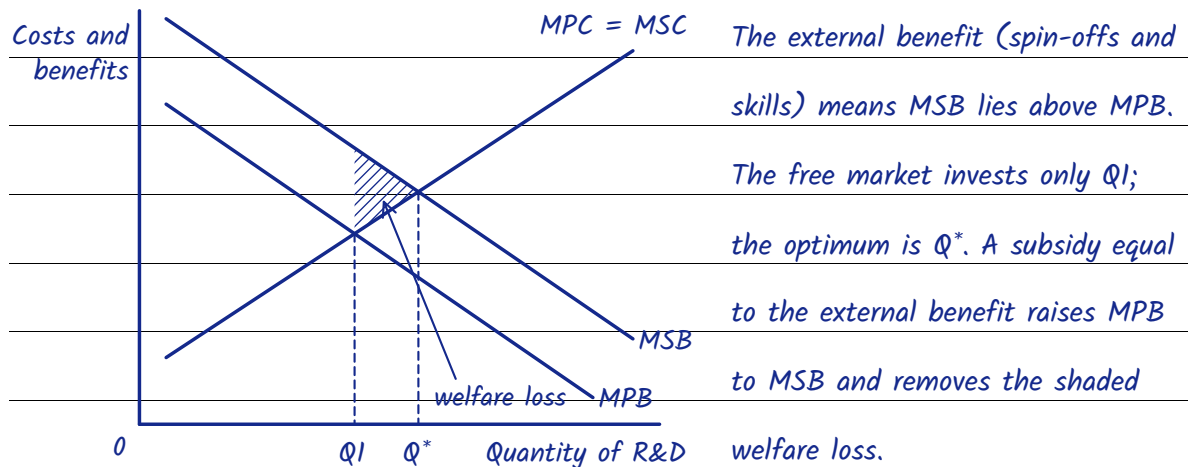
After considering **Extract D**, and the original evidence in **Extracts A, B and C**, would you recommend that the UK government provides financial and other support to companies involved in the production of commercial aircraft? Justify your recommendation.

[25 marks]

Government support could take the form of grants and subsidies for R&D, low-interest loans, funding for training and apprenticeships, and partnerships such as the 2018 Aerospace Sector Deal (Extract D). The economic case for support rests on market failure; the case against rests on the costs of intervention and the risk of government failure.

Positive externalities from R&D and human capital: developing new aircraft, engines and wings requires very high spending on R&D with long payback periods and great risk. Firms cannot capture all the benefits, because knowledge spills over to other firms and industries (for example advanced materials and electronics) and the skilled workers they train may move to other employers. The marginal social benefit (MSB) of R&D and training is therefore greater than the marginal private benefit (MPB). As the diagram overleaf shows, the free market invests only Q_I , where $MPC = MPB$, rather than the socially optimal Q^* , where $MSC = MSB$, so there is underinvestment and a welfare loss. A subsidy equal to the external benefit would raise the private return to MSB and move output to Q^* . Capital markets may also be unwilling to finance such risky long-term projects, so government loans can correct an information failure. Extract D notes that government financial support is already helping the industry stay competitive and develop new technologies. However, the external benefit is very hard to measure, so the subsidy could be set too high or too low.





Negative externalities: aviation creates external costs such as greenhouse gas emissions and noise, so MSC exceeds MPC and air travel is overconsumed.

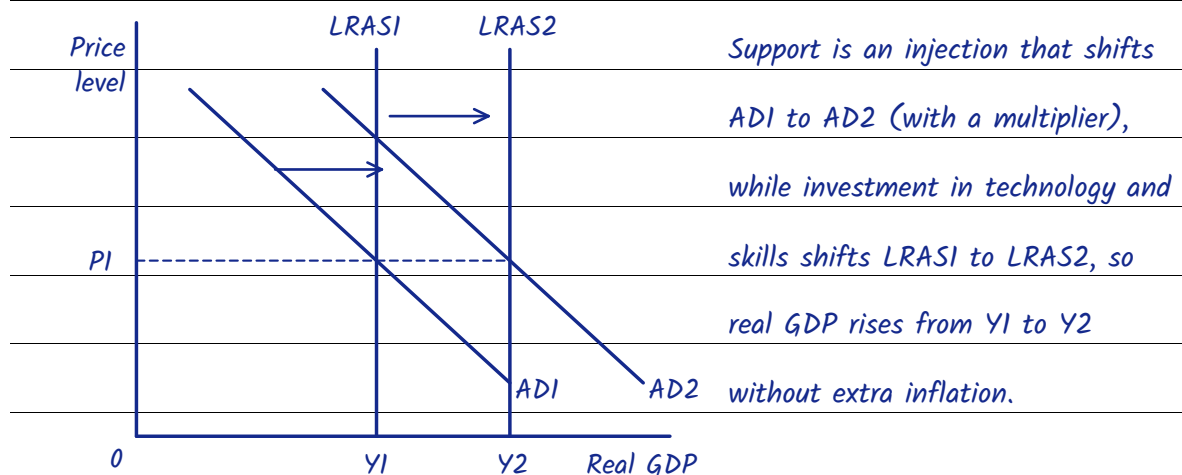
Support for developing cleaner technology, such as more fuel-efficient aircraft like the A321XLR, which uses 30% less fuel per seat (Extract C), reduces the external cost per flight. As Extract D argues, this is a genuine market failure that justifies state aid. However, if support simply makes air travel cheaper and expands it, total emissions could rise, so support should be tied to green technology.

Regional policy and employment: the UK aerospace sector employs over 120 000 skilled workers, mainly outside London and the south east. Without support, job losses in these less prosperous regions would cause structural unemployment, because labour is occupationally and geographically immobile.

Negative local multiplier effects and cumulative causation would spread decline to suppliers and local services. Support therefore protects incomes and helps to rebalance the economy, although the opportunity cost per job saved could be high.

Turn over ►





Macroeconomic benefits: as the diagram shows, government spending is an injection into the circular flow, so it raises AD from AD1 to AD2 and, through the multiplier, increases real GDP and employment in the short run. In the long run, investment in technology and human capital increases productive capacity, shifting LRAS1 to LRAS2 and allowing sustained growth without inflation. Demand is likely to grow strongly, with 38 000 new passenger aircraft needed over 20 years (Extract D) and a high income elasticity of demand, so supporting the industry helps the UK earn more from exports and improves the current account of the balance of payments. It also supports a high-value manufacturing sector, making the economy more diversified and less dependent on financial services.

A level playing field: the market is an oligopoly with huge economies of scale and high barriers to entry. Boeing and Airbus have both been subsidised (Extract D) and COMAC is state-owned, so without UK support British firms could lose contracts not because they are less efficient but because their rivals are subsidised. Temporary support may also be needed after a major shock such as the pandemic, to prevent viable firms closing and skills being permanently lost (hysteresis).

However, there are strong arguments against support. First, it can distort



Extra space *the pattern of comparative advantage (Extract D): if resources are kept in an industry where the UK is not the lowest opportunity cost producer, world output and the gains from trade fall. Second, subsidies may breach WTO rules. The Boeing and Airbus dispute led the WTO to rule that both sides had unfairly subsidised their manufacturers, allowing the US and EU to impose tariffs on each other's goods, which harmed unrelated exporters. Third, firms can become reliant on state aid, reducing the incentive to cut costs and innovate, which causes X-inefficiency and lower productivity. Fourth, support for incumbents makes it harder for new firms to enter, reducing competition.*

There is also an opportunity cost. Money spent on aerospace must be financed by higher taxes, more borrowing or cuts to other spending such as health and education, and after the pandemic the UK's budget deficit and national debt are already high. Finally, there is a risk of government failure: governments lack information on the size of external benefits and on which technologies will succeed, so they may 'pick losers'; support may reflect lobbying and political motives rather than economic efficiency; and administering schemes has costs. Demand is also uncertain, as stricter environmental policies could slow the growth of air travel.

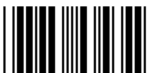
Evaluation: the strength of the case depends on several factors. It depends on the size of the externalities: the case is strongest for R&D, green technology and training, where the gap between MSB and MPB is large, and weakest for general production subsidies, which mainly transfer money to shareholders. It depends on whether the UK has a comparative advantage: Extract D says the UK is a world leader in engines, wings and advanced systems, which suggests support reinforces rather than distorts comparative advantage. The UK mainly supplies components to both Boeing and Airbus,

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so support for R&D and skills is less likely to provoke WTO retaliation than direct subsidies to aircraft sales. Timing also matters: in the short run, temporary support during the pandemic avoids the permanent loss of capacity, but in the long run open-ended support risks dependence and inefficiency.

Recommendation: I would recommend that the UK government does provide financial and other support, but that it is targeted, conditional and time-limited. It should focus on R&D into cleaner, more fuel-efficient aircraft, on training to build human capital, and on firms in less prosperous regions, since these are where genuine market failures exist and where the long-run benefits for growth, employment, exports and the environment are greatest. Support should be matched by private funding, linked to productivity and environmental targets, and designed to comply with WTO rules. This approach captures the benefits of correcting market failure while limiting the risks of government failure, retaliation and reliance on state aid.



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