# INSTITUTE AND FACULTY OF ACTUARIES

# EXAMINATION

11 April 2023 (am)

## Subject CB2 – Business Economics
## Core Principles

Time allowed: Three hours and twenty minutes

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

If you encounter any issues during the examination please contact the Assessment Team on T. 0044 (0) 1865 268 873.

**1** In economics, the problem of scarcity:

A exists only in economies that are at full employment.
B can be eliminated if prices are allowed to rise or fall so as to keep supply equal to demand.
C means that there are shortages of some goods due to demand being greater than supply.
D exists because there are insufficient resources to satisfy human wants.

[1½]

**2** What is the combined effect of a fall in the cost of production and a fall in consumer income on the equilibrium price and quantity of a normal good?

A The effect on price is indeterminate but quantity will fall.
B The effect on price is indeterminate but quantity will rise.
C The effect on quantity is indeterminate but price will fall.
D The effect on quantity is indeterminate but price will rise.

[1½]

**3** Economies of scale means:

A long-run total cost rises as output rises.
B long-run average total cost falls as output rises.
C short-run average total cost falls as output rises.
D short-run average total cost rises as output rises.

[1½]

**4** Which of the following does NOT necessarily apply to a perfectly competitive firm that produces in both the short run and the long run?

A The firm will equate its marginal costs to its average revenue.
B The firm will equate its marginal costs to its marginal revenue.
C The firm will have an average revenue that exceeds its average variable costs of production.
D The firm will make only normal profits.

[1½]

**5** The prisoner's dilemma, applied to a situation involving two oligopolistic firms, illustrates that:

A each firm will NOT take account of its rival's reactions when making its pricing decision.
B the price set by one firm will NOT influence the price set by the other firm.
C in avoiding the worst possible outcome, each of the firms will fail to reach the best possible outcome.
D in avoiding the worst possible outcome, each of the firms will succeed in reaching the best possible outcome.

[1½]

**6** The welfare consequences of third-degree price discrimination are to the benefit of:

A the consumers of the good at the expense of the producers.
B the producers of the good at the expense of the consumers.
C both the consumers and producers.
D neither the producers nor the consumers.

[1½]

**7** The demand for Good X has a price elasticity of −1. Tax on Good X is £10 per unit. If the government decides to reduce the tax on Good X to £5 per unit, this would shift the supply curve for Good X down by:

A less than £5 and decrease the price by less than £5.
B less than £5 and decrease the price by more than £5.
C £5 exactly and decrease the price by £5 exactly.
D £5 exactly and decrease the price by less than £5.

[1½]

**8** An economy moves from producing 15 units of Good X and six units of Good Y to instead producing 16 units of Good X and three units of Good Y. How many units of Good Y is the opportunity cost of the 16th unit of Good X?

A 1/3
B 2
C 3
D 5.

[1½]

**9** Which of the following best describes an annual demand curve?

A The quantity consumers would like to buy annually.
B The quantity consumers are willing and able to buy at each level of income over the next year.
C The quantity consumers are willing and able to buy annually at each price.
D The quantity consumers are willing and able to buy over the next year.

[1½]

**10** If a maximum price for Good X is fixed above the market equilibrium price, there will be:

A no tendency for the market price of Good X to change.
B an excess demand for Good X.
C an excess supply of Good X.
D an upward pressure on the price of Good X.

[1½]

**11** A firm's short-run total costs are £250 when ten units are produced and its total variable costs are £100. The marginal cost of producing the tenth unit is £27 and the marginal cost of producing the eleventh unit is £23. Which of the following is TRUE?

A The average total cost of the eleventh unit is greater than the average total cost of the tenth unit.
B The total fixed costs for eleven units are £177.
C The average fixed cost for eleven units is greater than the marginal cost for the eleventh unit.
D The average variable cost of production for the eleventh unit is less than the marginal cost of production for the eleventh unit.

[1½]

**12** In a duopoly industry, the profit payoffs to Firm X arising from various strategies will depend on Firm Y's strategy. The profit payoffs to Firm X are given below:

| | | *Firm Y's possible strategy* | | | |
|---|---|---|---|---|---|
| | | *5* | *6* | *7* | *8* |
| Strategy of Firm X | 1 | 90 | 40 | –10 | 100 |
| | 2 | 40 | 70 | –20 | –80 |
| | 3 | 25 | 50 | 120 | 130 |
| | 4 | 10 | 40 | 70 | 60 |

Which one of the following represents the maximin strategy of Firm X?

A Strategy 1
B Strategy 2
C Strategy 3
D Strategy 4.

[1½]

**13** Global Airways, which is a profit-maximising firm, has to decide whether or not to run an extra daily flight between London and Manchester. The total daily fixed costs of the airline are £4,000, the total variable costs of the extra flight are £4,500 and the expected average revenue from the extra flight is £50 with 85 passengers. In such circumstances, Global Airways will:

A not run the extra flight because it will expect profits to decrease (or losses increase) by £250.
B not run the extra flight because its expected profit of £250 is insufficient to cover its fixed costs.
C run the extra flight because that will increase profits (or reduce losses) by £250.
D run the extra flight because the expected revenue of £4,750 is more than its fixed costs.

[1½]

**14** Good X is an inferior good (but not a Giffen good). If a budget line is drawn with quantity of Good Y on the vertical axis and quantity of Good X on the horizontal axis, a fall in price of Good X will cause the budget line of the consumer to:

A shift to the right and the overall consumption of Good X to fall.
B become flatter and the overall consumption of Good X to rise.
C shift to the right and the overall consumption of Good X to rise.
D become steeper and the overall consumption of Good X to fall.

[1½]

**15** Which of the following could explain why a country's aggregate demand curve may shift inwards to the left?

A A decrease in interest rates
B An appreciation of the domestic currency
C A rise in government expenditure
D An increase in business confidence.

[1½]

**16** Which of the following statements about real variables in the economy is TRUE?

A If nominal Gross Domestic Product (GDP) rises by 3%, then the real GDP must have risen.
B The nominal GDP must change by a bigger percentage than the real GDP if there is positive rise in the GDP deflator.
C An increase in real income will lead to a fall in the demand for real money balances.
D Real interest rates can be negative even if both the nominal interest rate and expected inflation rate are positive.

[1½]

**17** In an economy operating significantly below the full employment level of output, the adoption of an expansionary fiscal policy combined with a contractionary monetary policy will result in:

A a rise in aggregate demand and a rise in unemployment.
B a rise in aggregate demand and a fall in unemployment.
C a fall in aggregate demand and a rise in unemployment.
D an indeterminate effect on aggregate demand and unemployment.

[1½]

**18** Which one of the following would NOT constitute a supply-side economic policy for reducing unemployment?

A Reducing social security benefits
B Increasing the money supply
C Reducing corporate and personal taxation
D Increased government expenditure on education and training.

[1½]

**19** In a simple closed economy with no taxes, consumption is given by the relationship:

$$C = £50 \text{ million} + 0.6\ Y$$

where $C$ is consumption expenditure and $Y$ is GDP.

If government expenditure is £100 million and investment is £50 million, what will be the equilibrium value of GDP of the economy?

A £200 million
B £600 million
C £1,000 million
D None of the above.

[1½]

**20** Which one of the following is most likely to lead to cost-push inflation?

A An increase in trade union powers
B An appreciation of the domestic currency's exchange rate
C A rise in labour productivity
D A decrease in the profit margins applied by firms.

[1½]

**21** Other things remaining the same, in a closed economy, the effect of a cut in government expenditure is to:

A lower short-term interest rates because the aggregate demand curve shifts to the left.
B raise short-term interest rates because the aggregate demand shifts to the left.
C lower short-term interest rates because the aggregate demand curve shifts to the right.
D raise short-term interest rates because the aggregate demand curve shifts to the right.

[1½]

**22** Assume that the actual rate of unemployment is below the natural rate of unemployment because the expected rate of inflation is below the actual rate of inflation. If the expected rate of inflation rises to equal the actual rate of inflation, then real wage growth will start to:

A fall, and real output will rise.
B fall, and real output will fall.
C rise, and real output will rise.
D rise, and real output will fall.

[1½]

**23** Which of the following is the correct response for the missing words, (i) and (ii), in the statement below?

Automatic stabilisers act to ___(i) ___ government expenditures and ___(ii)___ government revenues during a recession.

A (i) increase, (ii) decrease
B (i) increase, (ii) increase
C (i) decrease, (ii) increase
D (i) decrease, (ii) decrease.

[1½]

**24** In a closed economy, planned investment is £20 million, government expenditure is £40 million, planned savings are £15 million and taxes are £25 million. Which of the following is most likely to occur?

A National income will tend to increase.
B National income will tend to decrease.
C Unemployment and production will tend to fall.
D The general level of prices will tend to fall.

[1½]

**25** According to the quantity theory of money, an increase in the money supply is least likely to lead to inflation if the:

A velocity of circulation increases.
B real national income decreases.
C velocity of circulation is constant and the real national income increases.
D velocity of circulation and the real national income are constant.

[1½]

**26** Other things being equal in an economy with zero economic growth, if the expected rate of inflation on which wage settlements are based is 3% p.a. and the money supply is increasing at 4% p.a., then there will be a short-run:

A fall in inflation and fall in unemployment.
B rise in inflation and fall in unemployment.
C fall in inflation and rise in unemployment.
D rise in inflation and rise in unemployment.

[1½]

**27** You are given the following data concerning the average product of labour, which, along with five units of capital, are the only two factors of production used in the short-run production process:

| *Units of labour employed* | *Average product of labour (in units of output)* |
|---|---|
| 0 | – |
| 1 | 30 |
| 2 | 35 |
| 3 | 40 |
| 4 | 45 |
| 5 | 50 |
| 6 | 45 |
| 7 | 35 |

Each unit of capital costs £300 and each unit of labour costs £100.

(i) Calculate the marginal product of the fifth unit of labour. [1]

(ii) State whether the marginal product of the sixth unit of labour is greater or less than that of the third unit of labour. [1]

(iii) Calculate the average cost of production, if four units of labour are employed in the short run. [1]

(iv) Calculate the total cost of production when output is 270 units. [1]

(v) Determine how many units of labour the firm should employ if the good being produced can be sold at £40 per unit, regardless of the quantity sold. [1]

[Total 5]

**28** A consumer spends all of their money on two Goods, X and Y, and is currently maximising utility. Good Y is a normal good, while Good X is an inferior (but not Giffen) good. Use this initial equilibrium as your starting position in each case when answering parts (i) to (iii). In each part, explain your answer with reference to any income and substitution effects applicable.

(i) Explain the effect on the consumer's consumption of both Good X and Good Y, if the consumer's income increases. [2]

(ii) Explain the effect on the consumer's consumption of Good X if Good X falls in price. [2]

(iii) Describe the impact on the consumer's consumption of Good X if both Good X and Good Y rise in price by the same percentage. [2]

[Total 6]

**29** Explain the difference between the law of diminishing returns and diseconomies of scale in relation to the costs of production of a firm producing a good where the two factors of production are capital and labour. [5]

**30** The household water supply market is typically characterised by a monopoly supplier. Explain the reasons for this and discuss what measures governments can take to ensure that consumers are not excessively overcharged. [5]

**31** (i) A landlord is considering renting a property to a new tenant. Explain the problem of information asymmetry from the landlord's perspective, indicating the measures the landlord can undertake to mitigate the problem. [3]

(ii) Explain the likely effects on producer surplus of a rent control law that sets rents chargeable to below the free market rent. Comment on how this impact will depend on the price elasticity of supply for rental properties. [2]

[Total 5]

**32** A country with a fixed but adjustable exchange rate needs to reduce its trade deficit but has ruled out the use of either import quota or tariffs. Discuss the relative merits of various other measures the country's government could take to reduce its trade deficit. [5]

**33** You are given the following data for an economy:

| | *Year 2020 (£ millions)* |
|---|---|
| Consumer expenditure (excluding indirect taxes) | 140 |
| Investment | 60 |
| Government expenditure (including transfer payments) | 70 |
| Exports | 40 |
| Imports | 30 |
| Net income from abroad | 20 |
| Indirect taxes | 15 |
| Capital depreciation | 20 |
| Transfer payments | 10 |

(i) Calculate the GDP at market prices. [1]

(ii) Calculate the gross national income at basic prices. [1]

(iii) Calculate the net national income at market prices. [1]

(iv) Explain under what circumstances a 4% rise in the nominal GDP may be accompanied by a fall of 2% in the real GDP. [1]

(v) Explain whether a car that is produced during 2020 but is not sold will be included in the GDP figures for 2020. [1]

[Total 5]

**34** Explain how, in an open economy, an expansionary monetary policy is likely to impact on the various components that make aggregate demand in the short run. [5]

**35** (i) Explain the difference between the Bertrand model of oligopoly and the Cournot model of oligopoly. Explain which model can best explain 'price wars' that occasionally take place between supermarkets. [5]

(ii) Explain, with the aid of a numerical example, how game theory can result in two firms acting in isolation, both setting high outputs that are not in their mutual interests. Your answer should indicate how both firms agreeing to lower output can lead to higher joint profits. [5]

[Total 10]

**36** (i) Explain, with reference to the distinction between anticipated and unanticipated inflation, the reasons why economic policy makers are concerned about the effects of unanticipated inflation. [5]

(ii) Discuss how both fiscal and monetary policy can be used to control inflation and comment on any adverse implications for the broader economy of bringing inflation under control. [5]

[Total 10]

**END OF PAPER**

Institute and Faculty of Actuaries

# EXAMINERS' REPORT

## CB2 - Business Economics

## Core Principles

## Introduction

The Examiners' Report is written by the Chief Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

For some candidates, this may be their first attempt at answering an examination using open books and online. The Examiners expect all candidates to have a good level of knowledge and understanding of the topics and therefore candidates should not be overly dependent on open book materials. In our experience, candidates that spend too long researching answers in their materials will not be successful either because of time management issues or because they do not properly answer the questions.

Many candidates rely on past exam papers and examiner reports. Great caution must be exercised in doing so because each exam question is unique. As with all professional examinations, it is insufficient to repeat points of principle, formula or other text book works. The examinations are designed to test "higher order" thinking including candidates' ability to apply their knowledge to the facts presented in detail, synthesise and analyse their findings, and present conclusions or advice. Successful candidates concentrate on answering the questions asked rather than repeating their knowledge without application.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Sarah Hutchinson
Chair of the Board of Examiners
July 2023

## A. General comments on the *aims of this subject and how it is marked*

The aim of the Business Economics subject is to introduce candidates to the core economic principles and their relevance to the business environment.

The subject provides a grounding in the fundamental concepts of micro- and macro-economics as they affect the operation of insurance and other financial systems, both for individuals and their requirements for financial security, and for financial institutions and their ability to provide products that meet individual and institutional clients' needs.
The examination paper is designed to assess candidates' knowledge and understanding as well as application of economic concepts and exploration of the linkages within the wider economy, and the marking scheme duly reflects this aim.

## B. Comments on *candidate performance in this diet of the examination.*

Performance in this session was generally of a lower standard. Answers on multiple choice questions were of similar standards to previous sessions. However, for short answer questions requiring application of theory in different contexts, the answers generally explored parts of the theory and did not offer sufficient detail on the theory itself nor the application of the theory to the particular case. Answers to the long answer questions generally were not sufficiently detailed and lacked exploration of linkages between economic concepts and the possible impact on the whole economy. Presenting the discussion for long answer questions in bullet point form usually prevents exploring the linkages between various points and yields an answer that is insufficient in detail.

## C. Pass Mark

The Pass Mark for this exam was 60
833 presented themselves and 514 passed.

**Solutions for Subject CB2 – April 2023**

| | | |
|---|---|---|
| **1** | D | [1½] |
| **2** | C | [1½] |
| **3** | B | [1½] |
| **4** | D | [1½] |
| **5** | C | [1½] |
| **6** | B and C | [1½] |
| **7** | D | [1½] |
| **8** | C | [1½] |
| **9** | C | [1½] |
| **10** | A | [1½] |
| **11** | D | [1½] |
| **12** | C | [1½] |
| **13** | A | [1½] |
| **14** | B | [1½] |
| **15** | B | [1½] |
| **16** | D | [1½] |
| **17** | D | [1½] |
| **18** | B | [1½] |
| **19** | D | [1½] |
| **20** | A | [1½] |
| **21** | A | [1½] |
| **22** | D | [1½] |
| **23** | A | [1½] |
| **24** | A | [1½] |
| **25** | C | [1½] |
| **26** | B | [1½] |

*The multiple-choice questions were generally answered well. Workings were not required.*

*For Question 6, two answers B and C were accepted.*

**Q27**

(i)
70 [1]

(ii)
Less than [1]

(iii)
£10.56 [1]

(iv)
£2,100 [1]

(v)
6 units of labour [1]
**[Total 5]**

*This question was generally answered well. Workings were not required.*

**Q28**
(i)
Consumption of Good Y will rise but consumption of Good X will fall. This is because rise in income has no implications for relative prices of the two goods. As such, there is no substitution effect to consider, while the consumption of Good Y increases as it is a normal good and consumption of Good X falls as it is an inferior good. [2]

(ii)
Consumption of Good X will rise. This is because the cheaper price of Good X relative to good Y leads to a substitution effect in favour of Good X. While the rise in real income will lead to a negative impact on consumption of Good X that is not sufficient to offset the rise from the substitution effect. [2]

(iii)
Consumption of Good X will rise. This is because the relative prices remain the same so that there is no substitution effect. However, these is a fall in real income which will raise consumption of Good X. [2]
**[Total 6]**

*In parts (i)-(iii), 1 mark was allowed for including in the answer the income and substitution effects and 1 mark for the overall effect on the consumption of the goods.*

*Most candidates offered correct answers for the overall impact on consumption of the goods but few offered a good answer relating to the income and substitutions effects.*

**Q29**
The law of diminishing returns is the relevant factor in determining short run average costs of the firm. As increasing amounts of labour are added to a given amount of a fixed factor, capital, at some point, the marginal and average product tend to fall resulting in a rise in short run average costs of production. However, after a certain point marginal and eventually average product begin to decline. As marginal and average product decline, the short-run marginal and average costs will rise.

Diseconomies of scale relate to rising long run average costs of production. In the

long run all factors of production are variable, that is the amount of both capital and labour can be changed. If increasing all inputs increases output less than proportionately then long run average cost of production will rise. Diseconomies of scale can be caused by factors such as bureaucracy, management inefficiency, inflexibility and poor decision making etc. [5]

*The mark for this question was equally divided between explaining the diminishing returns and the diseconomies of scale. Some credit was given for mentioning the causes of the diseconomies of scale. Most answers were confined to defining the diseconomies of scale in terms of increasing long run average cost and did not offer a complete definition as shown in the model answer above.*

**Q30**

The household water supply industry is often characterised as a natural monopoly in that it would not make sense to have competing suppliers as it would involve an unnecessary duplication of resources and prevent the exploitation of economies of scale. There is a need to make sure the supply of water to households is done in a secure manner and that health and safety standards are upheld and it is easier for the authorities to monitor one company than many. Furthermore, given that water supply infrastructure is expensive to provide there are very considerable barriers to entry in the water supply industry.

Since waters supply is an essential good for households, there is a need to control the price at which it is delivered to the consumer. One method of achieving this is to have the industry run by the state so that consumers are charged a reasonable price in line with costs of production. An alternative is to allow the industry to be run by a private sector firm but also set up a regulator to control the prices charged to consumers so that the firm supplying water can only make a reasonable return on their capital employed. Government may also subsidise the industry to lower prices. [5]

*Half of the total marks for this question were allowed for explaining why water supply is a natural monopoly where barriers to entry, duplication of resources, economies of scale and health and safety issues could be mentioned.*

*The other half of the marks was allocated to explaining the reasons for the need for government control, where essential good, the need for price control, direct provision, private provision overseen by a regulator and subsidies may be mentioned.*

*This question was moderately well answered.*

**Q31**

(i)

The problem of information asymmetry arises because the landlord is not clear whether the prospective tenant intends to pay the rent on time and in full. The prospective tenant on the other hand has a better knowledge of their own finances and whether they intend to pay or not pay the rent on time. This information asymmetry can be reduced by the landlord performing credit checks on the person, asking to see evidence on pay and also taking out references on the prospective tenants. [3]

(ii)

A rent control law that sets the rent below the free-market price will lead to a lower supply of property on the market and also a lower rental rate and as such it will lower the producer surplus. The more elastic the supply curve then the greater would be the quantity of rented property withdrawn from the market and therefore the greater the loss in producer surplus. [2]

**[Total 5]**

*In part (i) most candidates demonstrated their understanding of the concept of information asymmetry correctly although quite a few responses approached the answer from tenants' perspective and lost marks.*

*In part (ii) to gain the marks, the answer was expected to include both the effect on producer's surplus and the effect of elasticity.*

**Q32**

Devaluation of the currency – this makes imports more expensive in domestic currency terms and exports cheaper in foreign currency terms. This should lead to a fall in import volumes and a rise in export volumes. One problem with this is that devaluation raises the cost of imports and therefore the cost of living in the country.

Fiscal restraint – a cut in fiscal expenditure (rise in taxes) will have reverse multiplier effects on national income resulting in reduced import expenditure via the marginal propensity to import. However, such a policy can lead to lower economic growth and higher unemployment.

Monetary restraint – as tight monetary policy will via higher interest rates restrain consumer expenditure and investment. This will reduce national income and import expenditure. However, such a policy will lower consumption and investment and slow down economic growth and unemployment.

Productivity improvements – increased productivity will improve the competitiveness of exports and the ability of import competing industries to compete against imports. But this will mean reforms, improved education and training and new investment which can be costly.

Subsidies – the government could subsidise exports of import competing industries. However, subsidies cost money, requiring financing from taxation and could lead to problems in relations with trading partners.

Government procurement policies could change such that government expenditure is switched away from imported goods to domestically produced goods so improving the trade balance. However, this can mean higher prices and lower quality than the imported goods and raise the size of the government budget deficit.

A government could introduce exchange controls that restrict its citizens ability to purchase foreign exchange and hence imports. If this is the case, then they may switch expenditure from imports to domestically produced goods. However, exchange rate controls restrict the ability of domestic residents to invest abroad and ability to obtain foreign consumer and investment goods that they may wish to purchase [5]

*Explaining two-three government measures in detail was sufficient to gain the full mark for this question including the disadvantage of using each measure. Most candidates offered more than one measure but answers generally lacked detail and few answers gained the full mark for this question.*

**Q33**

(i)
£285 million [1]

(ii)
£290 million [1]

(iii)
£285 million [1]

(iv)
A rise in the nominal GDP of 4% can be accompanied by a fall in the real GDP of 2% if the prices of goods and services that make the up the GDP as measured by the GDP deflator rise by approximately 6%. Since the broad measure of inflation in the economy rises more than the nominal GDP then this can account for the fall of 2% in the real GDP. [1]

(v)
If a car is produced but not sold it will be included in the GDP figure as a rise in inventories and this is part of the investment figures in the GDP accounts. [1]

**[Total 5]**

*This question for most parts was answered generally fairly well. Only the final correct answer in each part gained the mark.*

*However, in part (ii) where the incorrect answer in part (i) was used in the correct formula to arrive at an incorrect answer for part (ii), some credit was allowed.*

*In part (iii) to gain the mark, the answer needed to include the reason for the value of the car being included in the GDP figure. Only well prepared candidates gained the full mark for this question.*

**Q34**

An expansionary monetary policy is implemented through the central bank purchasing short term treasury securities, which raises the prices of treasury securities and lowers the short-term interest rate. The fall in the short-term interest rates will have effects on consumer expenditure, investment, and the quantity of exports.

The lower interest rate will boost consumer expenditure by making borrowing cheaper and savings less attractive.

The fall in interest rates will boost investment by reducing the cost of borrowing and making the net present value of investment opportunities greater.

A fall in interest rates should lead to a depreciation of the domestic currency which will boost exports by making them more competitive on international markets.

So overall an expansionary monetary policy should boost aggregate demand and reduce unemployment.

It will also reduce the demand for imports which become more expensive so the Volume of imports will be lower but the impact on import values will depend upon whether the fall in volumes has greater or less impact than the fact that each unit of imports costs more when measured in terms of the domestic currency. [5]

*Full marks were only given for a good explanation including the fall in interest rates and the impact on consumer expenditure, investment, unemployment, exports and imports. Government spending may also be mentioned.*

*Only well prepared candidates offered a sufficiently detailed answer to this question.*

**Q35**

(i)
In the Cournot model each firm assumes that the other firm produces a given amount of output and then deducts this from the market demand curve, the residual demand curve is then regarded as its demand curves. The firm then sets its profit maximising output. So Firm A assumes that Firm B produces a certain quantity of a good and then deducts this from the market demand curve. Similar reasoning also applies to firm B with respect to firm A's output. The Cournot equilibrium result is when the two firms both make the correct assumption about the output of the other firm and hence have no furth incentive to change their own output. [2]

By contrast, under the Bertrand model of oligopoly, each firm takes the price of the other firm as given and then sets its optimal price. This means charging a lower price than the other firm. The other firm will also do likewise and this can lead to price cuts that eventually leave neither of the two firms able to cover their total costs and thus both become unprofitable. [2]

The Bertand model is a good explanation of price wars that occasionally occur between supermarkets as they vie to get more customers. The problem is the price cuts eventually lead to a hit to profits that they find to be unsustainable in the longer term This means that eventually the price cuts will be reversed enabling the firms to restore profit levels sufficiently to keep their owners and shareholder happy. [1]

(ii)

| Firm B's output | |
|---|---|
| Low | High |
| Low £10 million A, £10 million B | £5 million A, £12 million B |
| | |
| Firm A's output | |
| Low | High |
| High £12 million A, £5 million B | £8 million A, £8 million B |
| | |

In the above Firm B will choose to set the high output as this is its dominant strategy regardless of whether Firm A sets a low or high output. Likewise Firm A will choose to set the high output as this is its dominant strategy regardless of whether Firm B sets a low or high output. The result is they both make profits of £8 million each if they act in isolation. However, if they were both to collude to both set a low output (a cooperation scenario) then the result would be higher profits of £10 million each. [5]

**[Total 10]**

*In part (i) Most candidates offered a brief explanation of the two models but most answers lacked detail.*

*In part (ii) answers were expected to provide a numerical example of the game theory with profits resulting from price/output decisions. Candidates were also expected to analyse the strategies within the context of their example. Answers that provided only a table with numbers without correct reference to what the numbers represented and also answers where a general explanation of the prisoners' dilemma was given were not accepted.*

**Q36**

(i)

Most economists today recognise that there is a need to distinguish between anticipated and unanticipated inflation when discussing the harmful effects of inflation. It is generally accepted that unanticipated inflation is more harmful than anticipated inflation since unanticipated inflation has not been factored in by firms, households, borrowers and lenders when making their decisions. [1]

There are many harmful effects to the economy that are caused by unanticipated inflation. Inflation can arbitrarily redistribute incomes, For example, it erodes the purchasing power of those on fixed incomes.

Inflation also tends to benefit borrowers of funds at fixed rates of interest while penalizing those that have lent at the fixed rate of interest and inflation can also reduces the value of savings to the extent that inflation rate is above the rate of return on savings. In addition, inflation adversely affects business planning and investment with businesses finding it harder to forecast costs, revenues and interest rates.

Inflation will harm a country's international competitiveness especially if the exchange rate of the domestic currency is fixed. A rise in prices, would make exports more expensive and imports cheaper with adverse effects on the current account balance. Inflation and expectations of future inflation lead to upward pressure on interest rates in the financial markets and this means increased government borrowing costs from the issuance of bonds. In turn, this will reduce investment in the economy and so lower the economic growth rate.

It should also be noted that the recorded inflation rate is an average of price rises in the economy. Some firms will raise their prices more than the average and others will raise them by less than the average. However, workers will tend to want wages rises that are in line with rises in the average rate of inflation and this will mean difficulty and lower profits for firms who are only able to raise their prices less than the average, and such firms may suffer from strikes and industrial disruption as workers seek compensation. [5]

(ii)
Contractionary fiscal and monetary policies are potentially useful tools to control inflation. A contractionary fiscal policy involves reducing government expenditure and/or raising taxes. As such, a contractionary fiscal policy mainly helps to reduce inflationary pressures in the economy by reducing aggregate demand in the economy. A contractionary fiscal policy can also help in the longer run fight against inflation because less government borrowing will reduce the temptation for a government to print money to finance the national debt. However, it needs to be recognised that lower government expenditure and higher taxes can lower employment and economic growth in the short term.

A contractionary monetary policy operates through government sales of treasury securities which lowers the price of treasury securities and thereby implies higher short term interest rates. A contractionary open market operation results in the public holding more treasury securities and less narrow money which in turn will reduce the broad money supply dues to the link between the broad and narrow money supply as given by the money multiplier. Less broad money in the economy will in turn imply a reduced demand for goods and services and lower investment, the fall in aggregate demand should then lead to a lower inflation rate and lower employment. In addition, monetarist argue that that there is a link between the rate of growth of the money supply and the rate of inflation so slower monetary growth will have the effect of lowering current and expected inflation rates. In an open economy context, the higher short term interest rate associated with tighter monetary policy may lead to an appreciation of the domestic currency lowering the cost of imports and thereby reducing the recorded rate of inflation. Since most economies are fairly open this can represent a significant contribution to inflation control especially as lower prices for goods will in turn encourage wage moderation. Of course, tighter monetary policy may well have adverse impacts on investment, consumption, economic growth and unemployment rates. [5]

**[Total 10]**

*In order to gain the mark for part (i) answers needed to include a brief explanation of the distinction between anticipated and unanticipated inflation and two-three effects of unanticipated inflation. Many answers to this part lacked sufficient detail to gain the full mark.*

*In part (ii) most candidates offered the correct policies but answers generally lacked sufficient detail in regards to the impact of the policies on the economy and inflation.*

**[Paper Total 100]**

# END OF EXAMINERS' REPORT


Institute and Faculty of Actuaries

**Beijing**
14F China World Office 1 · 1 Jianwai Avenue · Beijing · China 100004
Tel: +86 (10) 6535 0248

**Edinburgh**
Level 2 · Exchange Crescent · 7 Conference Square · Edinburgh · EH3 8RA
Tel: +44 (0) 131 240 1300

**Hong Kong**
1803 Tower One · Lippo Centre · 89 Queensway · Hong Kong
Tel: +852 2147 9418

**London (registered office)**
7th Floor · Holborn Gate · 326-330 High Holborn · London · WC1V 7PP
Tel: +44 (0) 20 7632 2100

**Oxford**
1st Floor · Belsyre Court · 57 Woodstock Road · Oxford · OX2 6HJ
Tel: +44 (0) 1865 268 200

**Singapore**
5 Shenton Way · UIC Building · #10-01 · Singapore 068808
Tel: +65 8778 1784

www.actuaries.org.uk