

Name: _____

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IB Economics — Practice Exam

Instructions: Answer all questions in the spaces provided. Show your working — method marks are awarded even when the final answer is wrong. The answer key with worked solutions is available at examtex.com/free-exams.

Time Limit: 60 minutes

Short Answer (2 questions)

- [20 points] 1. Study the following extract and answer the questions that follow. — "Meloria's sugar tax divides opinion." The government of Meloria has introduced an indirect tax of 0.40 dollars per litre on sugary drinks, citing an adult obesity rate that has climbed to 31 percent. In the first year of the tax, the average retail price of sugary drinks rose by 10 percent while the volume of sales fell by 4 percent. The finance ministry expects the tax to raise about 120 million dollars per year, which it says will be earmarked for school nutrition programmes. Drinks manufacturers argue that the tax is regressive and note that many consumers are simply switching to untaxed fruit juices and flavoured milks, some of which contain just as much sugar.
- [4 points] (a) Define the following terms from the text: (i) indirect tax; (ii) regressive (tax).

- [3 points]** (b) Using figures from the text, calculate the price elasticity of demand for sugary drinks in Meloria. Show your working and comment on your result.

- [4 points]** (c) Using a demand and supply diagram, explain how the tax of 0.40 dollars per litre affects the market for sugary drinks in Meloria.

- [9 points]** (d) Using information from the text and your knowledge of economics, evaluate the effectiveness of the tax on sugary drinks in reducing obesity in Meloria.

- [20 points]** 2. Study the following extract and answer the questions that follow. — "Orvia's central bank tightens again." The Central Bank of Orvia has raised its policy interest rate from 3.0 percent to 5.5 percent, tightening monetary policy for the third time this year in an effort to return inflation to its 2 percent target. Over the past twelve months the consumer price index has risen from 125.0 to 134.0, driven by strong consumer spending and wage growth of 6 percent. The governor said that "demand is running ahead of what the economy can supply", but acknowledged that around 60 percent of Orvian mortgages are on variable interest rates. Business groups warn that higher borrowing costs will delay investment projects and could push the economy into recession.

- [4 points]** (a) Define the following terms from the text: (i) inflation; (ii) monetary policy.

- [3 points]** (b) Using the consumer price index figures in the text, calculate the rate of inflation over the past twelve months, and hence calculate the real rate of interest after the increase in the policy rate. Show your working.

- [4 points]** (c) Using an AD/AS diagram, explain how the increase in the interest rate is intended to reduce the rate of inflation in Orvia.

- [9 points]** (d) Using information from the text and your knowledge of economics, evaluate the likely consequences of the Central Bank of Orvia's decision to raise interest rates.

Calculations (1 question)

- [12 points]** 3. (HL) In the country of Astria, the weekly market for bottled energy drinks is described by the following linear functions, where P is the price in dollars per bottle and Q is the quantity in thousands of bottles per week.

$$Q_d = 60 - 4P, \quad Q_s = -12 + 8P$$

- [2 points]** (a) Calculate the equilibrium price and equilibrium quantity. Show your working.

[2 points] (b) Calculate consumer surplus and producer surplus at this equilibrium.

[2 points] (c) The government imposes an indirect (specific) tax of 1.50 dollars per bottle on producers. Calculate the new equilibrium quantity, the price paid by consumers, and the price received by producers.

[1 point] (d) Calculate the government revenue from the tax.

[2 points] (e) Calculate the welfare (deadweight) loss resulting from the tax.

[3 points] (f) The government's stated aim is to reduce the consumption of energy drinks among teenagers. Using your results from parts (a) to (e), recommend a policy, other than raising the tax further, that the government could use to achieve this aim.

Answer Key

1. (a) (i) An indirect tax is a tax on expenditure on goods and services, paid to the government by the seller (producer), which raises the cost of supplying each unit and can be partly passed on to consumers as a higher price. A specific (per-unit) tax, as here, is a fixed amount – 0.40 dollars – per litre sold. (ii) A regressive tax is one that takes a larger proportion (percentage) of income from low-income households than from high-income households – as income rises, the average rate of the tax falls. Each definition earns 2 marks for precise mark-scheme wording; vague answers ("a tax on companies", "a tax that is unfair to the poor") earn at most 1.
- (b) $PED = \frac{\% \Delta Q_d}{\% \Delta P} = \frac{-4\%}{+10\%} = -0.4$. Since $|PED| = 0.4 < 1$, demand for sugary drinks is price inelastic: the 10 percent price rise produced only a 4 percent fall in quantity demanded, so total consumer spending on sugary drinks actually rose. (1 mark for the formula, 1 for the correct value -0.4 , 1 for identifying inelastic demand.)
- (c) Expected diagram: price (dollars per litre) on the vertical axis, quantity of sugary drinks on the horizontal axis; a relatively steep demand curve D (reflecting $PED = -0.4$ from part b) and an upward-sloping supply curve S intersecting at the original equilibrium (P_1, Q_1) . The specific tax shifts the supply curve vertically upward by exactly 0.40 dollars to $S + tax$. At the new equilibrium (P_2, Q_2) : the price paid by consumers rises by most of the 0.40 (with relatively inelastic demand, most of the incidence falls on consumers), the price received by producers $(P_2 - 0.40)$ falls by less, and quantity falls only modestly from Q_1 to Q_2 – consistent with the 4 percent fall in sales in the text. Explanation: the tax raises the sellers' cost of supplying each litre by 0.40 dollars, so at every price they are willing to supply less; the market clears at a higher price and a lower quantity. 2 marks for a correct, fully labelled diagram; 2 for the written explanation linked to it.
- (d) A top-band answer presents arguments, counter-arguments and a reasoned judgement. Arguments that the tax is effective: (1) it corrects the negative consumption externality by raising price – sales have already fallen 4 percent; (2) the 120 million dollars per year earmarked for school nutrition programmes attacks obesity through a second channel; (3) in the long run PED is likely to rise as consumers adjust habits, and manufacturers may reformulate drinks with less sugar to escape the tax. Arguments that it is not: (1) with $PED = -0.4$ demand is price inelastic, so consumption falls little while consumers – including low-income households, for whom the tax is regressive – bear most of the burden; (2) the text reports switching to untaxed fruit juices and flavoured milks with just as much sugar, so total sugar intake falls by less than drink sales; (3) obesity has many causes (diet, exercise, income), so a tax on one product category is a blunt instrument. Judgement criteria examiners reward: distinguishing the short run (small response) from the long run (larger response as habits and products adjust); weighing stakeholders (consumers, low-income households, producers, government); and making effectiveness conditional – on its own the tax reduces obesity only modestly, and it works best combined with the funded nutrition programmes and a broader base covering substitute sugary products.
2. (a) (i) Inflation is a sustained increase in the general (average) price level of goods and services in an economy over time, typically measured by the annual percentage change in a consumer price index. (2 marks: "general/average price level" and "sustained/over time" are both required – "prices going up" alone earns 1.) (ii) Monetary policy is the use of interest rates (and/or the money supply) by the central bank to influence aggregate demand in order to achieve macroeconomic objectives, in particular a low and stable rate of inflation. (2 marks: the tool – interest rates/money supply – and the operator/aim – central bank influencing AD or price

stability.)

(b) Rate of inflation = $\frac{134.0-125.0}{125.0} \times 100 = \frac{9.0}{125.0} \times 100 = 7.2$ percent. Real interest rate $\approx$ nominal interest rate – inflation rate = $5.5 - 7.2 = -1.7$ percent. Even after the increase, the real cost of borrowing is still negative – a point worth carrying into part (d). (1 mark for the inflation formula using the base-year index, 1 for 7.2 percent, 1 for –1.7 percent.)

(c) Expected diagram: average (general) price level on the vertical axis, real GDP (real output) on the horizontal axis; an upward-sloping SRAS curve and an initial aggregate demand curve AD_1 intersecting at price level PL_1 and output Y_1 . Higher interest rates raise the cost of borrowing and the reward for saving, so households cut credit-financed consumption (C) and firms postpone debt-financed investment (I); since $AD = C + I + G + (X - M)$, aggregate demand shifts left to AD_2 (a stronger answer adds that higher rates may also appreciate the currency, reducing net exports). The new equilibrium shows a lower price level PL_2 – in practice, a lower rate of inflation – and lower real output Y_2 . An arrow on the shift and the labels $PL_1 \rightarrow PL_2$, $Y_1 \rightarrow Y_2$ are required for full marks. 2 marks for the diagram; 2 for the transmission mechanism explained in words.

(d) A top-band answer presents arguments, counter-arguments and a reasoned judgement. Arguments supporting the decision: (1) the evidence points to demand-pull inflation – the governor's "demand is running ahead of what the economy can supply" and 6 percent wage growth – and contractionary monetary policy is the textbook remedy for excess demand; (2) from part (b), the real interest rate is still –1.7 percent, so even at 5.5 percent policy is arguably not yet restrictive; (3) acting decisively anchors inflation expectations and reduces the risk of a wage-price spiral. Arguments against / costs: (1) 60 percent of mortgages are variable-rate, so household disposable income falls quickly and indebted households are hit hardest; (2) business groups warn investment will be delayed – lower I reduces current AD and also the long-run growth of productive capacity; (3) monetary policy operates with time lags of one to two years, so successive rises risk overtightening into the recession the text mentions; (4) rate rises are largely ineffective against any cost-push component of inflation. Judgement criteria: the cause of inflation (the demand-pull evidence strengthens the case for the rise), short-run costs (slower growth, possible unemployment) versus long-run benefits (price stability, credibility), and distributional effects (borrowers lose, savers gain). A justified conclusion – e.g., the rise is appropriate given demand-pull inflation and negative real rates, but the bank should pause to observe the lagged effects before tightening further – earns the top band.

3. (a) At equilibrium $Q_d = Q_s$: $60 - 4P = -12 + 8P \Rightarrow 72 = 12P \Rightarrow P^* = 6$ dollars per bottle. $Q^* = 60 - 4(6) = 36$ thousand bottles per week (check with supply: $-12 + 8(6) = 36$).
- (b) Demand intercept: $Q_d = 0$ at $P = 15$; supply intercept: $Q_s = 0$ at $P = 1.50$. Consumer surplus = $\frac{1}{2} \times 36 \times (15 - 6) = 162$ thousand dollars per week. Producer surplus = $\frac{1}{2} \times 36 \times (6 - 1.50) = 81$ thousand dollars per week.
- (c) Producers now receive $P - 1.50$ for each bottle sold at consumer price P , so the supply function becomes $Q_s = -12 + 8(P - 1.50) = -24 + 8P$. Equilibrium: $60 - 4P = -24 + 8P \Rightarrow 84 = 12P \Rightarrow$ price paid by consumers = 7.00 dollars; price received by producers = $7.00 - 1.50 = 5.50$ dollars; new quantity = $60 - 4(7) = 32$ thousand bottles per week. Note the incidence: consumers bear 1.00 of the 1.50 tax (two-thirds), because demand ($|slope| = 4$) is less price-responsive than supply ($slope = 8$).
- (d) Government revenue = tax per unit $\times$ new quantity = $1.50 \times 32 = 48$ thousand dollars per week.
- (e) The tax reduces the quantity traded from 36 to 32 thousand bottles. The welfare loss is the triangle between the demand curve and the original supply curve over the lost output: $\frac{1}{2} \times (36 - 32) \times 1.50 = \frac{1}{2} \times 4 \times 1.50 = 3$ thousand dollars per week – surplus on the 4 thousand

bottles no longer traded, lost to consumers and producers but not captured as government revenue.

(f) A full answer names one policy, justifies it with the data, and acknowledges a limitation. Example: the tax cut consumption only from 36 to 32 thousand bottles (about 11 percent), because demand is price inelastic at the original equilibrium ($PED = -4 \times \frac{6}{36} \approx -0.67$), and it applies to all consumers rather than the target group. A minimum purchase age — or a ban on marketing energy drinks to under-18s — targets teenagers directly and works regardless of PED. Limitations: enforcement costs, no tax revenue, and possible proxy purchasing by adults. Judgement: regulation is better matched to the specific aim, and keeping the existing tax alongside it preserves the 48 thousand dollars per week of revenue. (1 mark for a valid policy, 1 for justification using the calculated results, 1 for a recognised limitation or reasoned judgement.)

Worked Solutions

Question 1. (a) (i) An indirect tax is a tax on expenditure on goods and services, paid to the government by the seller (producer), which raises the cost of supplying each unit and can be partly passed on to consumers as a higher price. A specific (per-unit) tax, as here, is a fixed amount — 0.40 dollars — per litre sold. (ii) A regressive tax is one that takes a larger proportion (percentage) of income from low-income households than from high-income households — as income rises, the average rate of the tax falls. Each definition earns 2 marks for precise mark-scheme wording; vague answers ("a tax on companies", "a tax that is unfair to the poor") earn at most 1.

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