

January Examination Period 2025

ECN113: Principles of Economics

Duration: 2 hours

**YOU ARE NOT PERMITTED TO READ THE CONTENTS OF THIS QUESTION PAPER UNTIL
INSTRUCTED TO DO SO BY AN INVIGILATOR**

Answer ALL questions

Cross out any answers that you do not wish to be marked.

Calculators are permitted in this examination. Please state on your answer book the name and type of machine used.

Complete all rough workings in the answer book and cross through any work that is not to be assessed.

Possession of unauthorised material at any time when under examination conditions is an assessment offence and can lead to expulsion from QMUL. Check now to ensure you do not have any notes, mobile phones, smartwatches or unauthorised electronic devices on your person. If you do, raise your hand and give them to an invigilator immediately.

It is also an offence to have any writing of any kind on your person, including on your body. If you are found to have hidden unauthorised material elsewhere, including toilets and cloakrooms it will be treated as being found in your possession. Unauthorised material found on your mobile phone or other electronic device will be considered the same as being in possession of paper notes. A mobile phone that causes a disruption in the exam is also an assessment offence.

EXAM PAPERS MUST NOT BE REMOVED FROM THE EXAM ROOM

Examiner: Dr. Eileen Tipoe

PART A: LONG-ANSWER QUESTIONS**Question 1 (40 marks)**

Anil works for a small firm. Figure A shows the labour market conditions that Anil faces.

For all parts of this question, assume Anil's planning horizon (the length of time he uses to make decisions today) is 40 weeks.

Wage	£7 / hr
Disutility of effort	£2 / hr
Unemployment benefits	£3 / hr
Disutility from unemployment	£2 / hr
Expected # weeks unemployed (if fired from his job)	20
Working hours per week	40

Figure A. Labour market information for Question 1.

a) Using the information in Figure A, show that Anil's total employment rent is £3,200.

[4 marks]

b) Anil receives a one-off offer to work for another firm (meaning that he only has one chance to accept or reject this offer). The wage is lower (£5/hr) but the working hours are shorter (35 hours per week) and it is less stressful, so his disutility of effort is lower too (£1/hr). If Anil were to lose that new job, he would expect to be unemployed for 30 weeks before finding a new job at the same wage.

- How (if at all) does Anil's employment rent from his current job change? Explain your answer.
- Suppose that if Anil were to accept this offer, he would never be allowed to return to his current job. Use appropriate employment rent calculations to advise Anil on whether he should accept this offer or not.

[6 marks]

c) Anil's co-worker Bala has a lower disutility of effort from work (£1/hr) and a higher disutility from unemployment (£3/hr). Describe how Anil's best response curve (with hourly effort on the vertical axis and hourly wage on the horizontal axis) differs from Bala's best response curve. (You do not have to draw a diagram; a detailed description of the relevant curves is enough.)

[4 marks]

Anil's firm changes ownership. The previous owner had an agreement with the workers to pay wages above the profit-maximising wage, but the new owner only cares about profits and wants to cut wages.

d) Assume that labour is the sole cost of production.

- The per-worker quantity produced (output, Q) and per-worker cost of producing a given quantity $c(Q)$ both depend on the wage w : $Q(w) = 8w$, and $c(Q(w)) = 2w^2$.
- There are 50 workers in Anil's firm (including Anil).
- Output is sold in a competitive market at a price of £2 per unit.

Based on this information, what wage will the new owner choose?

[4 marks]

The workers are not happy with the wage cut. Anil attends a labour union meeting, where the workers are thinking about taking strike action for two weeks.

- If they go on strike, they will not be paid any wages or be eligible to receive unemployment benefits from the government.
- If the strike action is successful, then after 2 weeks, workers will return to work and be paid an hourly wage that is £2 higher than their current wage (the answer to part (d)).
- If the strike action is unsuccessful, then after 2 weeks, workers will return to work for the same wage as in part (d), but their disutility of work increases (Anil's will increase to £3 instead of £2).

e) Each worker can vote on whether to take strike action or not. If it is equally likely that the strike action will be successful or unsuccessful, then how should Anil vote? Explain your answer.

(Hint: Calculate the expected employment rent from strike action and compare it to Anil's current employment rent. Remember that Anil's next-best option is unemployment, and that if he loses this job, he can find another job at the same wage as his current job.)

[Note: If you were unable to answer part d), you can use $w = £3$ to answer this question. $w = £3$ is not the correct answer to part d).]

[8 marks]

Anil's co-worker Bala suggests that they try to negotiate with the employer instead of taking strike action. Recently, the market for their product has become more competitive, so starting next month, the firm will lower its product price to £1.5.

Bala proposes that despite the lower product price, if the employer raises their wage to £6, then the workers' cost of effort/production will decrease (as they are now more motivated to do work), so the per-worker cost of effort changes to w^2 (instead of $2w^2$).

f) By showing the appropriate calculations, explain whether the employer would accept this offer.

[4 marks]

g) In the context of the wage-setting/price-setting model, explain how Bala's proposal in part (f) is related to:

- The union wage-bargaining effect
- The union voice effect

[4 marks]

Assume that the economy is made up of several firms that are identical to the one Anil works for and that all workers belong to the same labour union. Also assume that there is only one product in this economy, so the selling price is the price level.

h) Draw one WS-PS diagram (real wage on the vertical axis, number of workers employed on the horizontal axis) to show the combined effects of:

- an increase in market competition, and
- successful wage negotiations (all firm owners accept the proposal described in part (f)).

For each effect, explain which curve(s) shift and why.

(You do not need to include specific numbers on the horizontal axis but should include specific numbers on the vertical axis, using your answers to parts (d) and (f).)

[6 marks]

Question 2 (15 marks)

Zoe and Yvonne are two farmers who share one plot of land. They each simultaneously choose to grow one type of crop (Rice or Cassava) and sell it at the town market. Figure B shows the payoff matrix for this game, where payoffs are measured in GBP received for their crops.

		Yvonne	
		Rice	Cassava
Zoe	Rice	80, 10	10, 20
	Cassava	10, 5	20, 40

Figure B. Payoff matrix for Question 2.

a) Explain what the concept of Nash equilibrium means and find the Nash equilibrium of this game (there is only one).

[3 marks]

In Zoe and Yvonne's village, there are 50 farmers in Zoe's situation and 50 farmers in Yvonne's situation (including Zoe and Yvonne). Each pair of farmers plays the game in Figure B once.

b) Using the Nash equilibrium from part (a), calculate the income shares of the "Zoes" and "Yvonnés", and hence draw the Lorenz curve for this population (cumulative share of income on the vertical axis, cumulative share of the population (poorest to richest) on the horizontal axis). (If you are using decimals, round your answers to 1 decimal place.)

[Note: If you were unable to answer part (a), choose any outcome from Figure B and draw the corresponding Lorenz curve. In your answer, clearly specify the outcome you chose.]

[5 marks]

c) Suppose that under the current arrangement, the poorer group of farmers would like to move to an outcome that gives them the highest possible payoff. To get the richer farmers to agree, the poorer farmers offer to transfer some of their payoffs from this outcome to the richer farmers, so that this outcome becomes another Nash equilibrium.

- What is the new Nash equilibrium and what payoffs do Zoe and Yvonne receive?
- Calculate the Gini coefficients from the Nash equilibrium in part (a) and the new Nash equilibrium. (Round your answers to 3 decimal places.)
- Describe how this new arrangement affects inequality in the village.

[7 marks]

Question 3 (15 marks)

Robinson Crusoe lives alone on an island, where he can gather fish or coconuts to consume. His utility, defined over fish (f) and coconuts (c), is

$$u(f, c) = \ln(c) + \ln(f).$$

a) Show mathematically that Robinson Crusoe's marginal rate of substitution (when his indifference curves are plotted with fish on the horizontal axis and coconuts on the vertical axis) is $\frac{c}{f}$ (in absolute value).

[2 marks]

The equation of Robinson Crusoe's production possibility frontier, which shows the amount of fish and coconuts that he can gather each day, is

$$f^2 + \frac{1}{8}c^3 = 9$$

b) Show that the marginal rate of transformation (the slope of this production possibility frontier, when plotted with fish on the horizontal axis and coconuts on the vertical axis) is $\frac{16f}{3c^2}$ (in absolute value).

(Hint: apply the same partial derivative method as in part (a) or rearrange the equation so that c is the subject and take the derivative with respect to f .)

[4 marks]

c) Currently, Robinson Crusoe consumes 1 fish and 4 coconuts each day. Explain, using the appropriate calculations and/or diagrams, why he is not maximising his utility.

[3 marks]

d) Find the combination of fish and coconuts that maximises his utility and draw an indifference curve/feasible frontier diagram to illustrate your answer. Plot fish on the horizontal axis and coconuts on the vertical axis. (Note: If your answers are not whole numbers, round them to 2 decimal places.)

[6 marks]

PART B: SHORT-ANSWER QUESTIONS

For each of the statements below, determine whether it is true or false and provide a short explanation (around 1-3 sentences) of your answer. One example is given below.

Each statement is worth 3 marks: 1 mark for the correct answer, 2 marks for a valid explanation.

[Example]

Statement: A monopoly is a price-taking firm.

Answer: False

Explanation: A monopoly is a price-setting firm because it chooses price to maximise profits rather than taking the market price as given.

Question 4

Malthus' Law states that an increase in productivity will result in both increased population and increased wages in the long run.

Question 5

Consider a worker whose choice is between hours of free time and consumption. His company has now cut his wage rate.

Statement: The substitution effect would incentivize the worker to take less free time.

Question 6

Consider indifference curves for consumption of milk and chocolates (you may assume that both are "goods".) The indifference curves are drawn with number of chocolate bars on the horizontal axis and pints of milk on the vertical axis.

Statement: If Consumer A likes chocolate (relative to milk) much more than Consumer B does, then Consumer A's indifference curves are steeper than Consumer B's at any given point.

Question 7

For the demand curve shown in Figure C, demand at point B is more responsive (in absolute value) to changes in price than at point C.

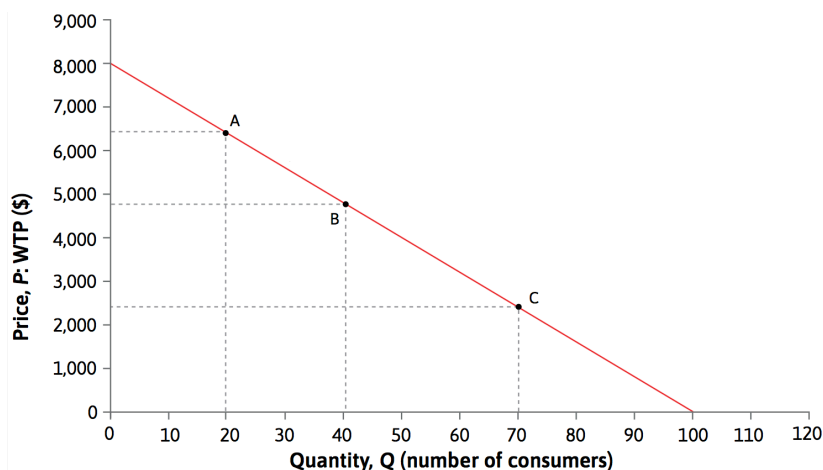


Figure C. Demand curve for Question 7.

Question 8

Figure D shows the outcome when the government imposes a per-unit tax of £60 on producers.

Statement: The after-tax consumer surplus will be lower if the government imposed the £60 per-unit tax on consumers instead of on producers.

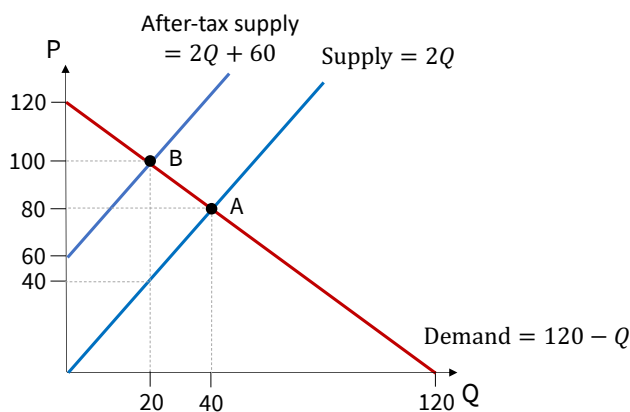


Figure D. Supply-demand diagram for Question 8.

Question 9

There are 6 students that each want to buy one economics textbook. Figure E shows the willingness to pay of each student.

Student A	65
Student B	59
Student C	57
Student D	52
Student E	48
Student F	45

Figure E. Willingness to pay (£)

Statement: If the unit price of that textbook is £50, then consumer surplus is £33.

Question 10

If we observe Anna choosing 8 notebooks and 2 pens under one set of prices, then choosing 20 notebooks and 6 pens under a different set of prices, then it is possible that notebooks and pens are perfect complements in Anna's utility function (defined over notebooks and pens).

Question 11

Suppose you are the Responder in an ultimatum game, and your payoff from rejecting the Proposer's offer of y is $R \times (x^* - y)$, where R represents the strength of your private reciprocity motive, and x^* represents the social norm of what Proposers are supposed to offer the Responders. **Statement:** If $R = 1$, then you would reject any offers of less than half of x^* .

Question 12

Bridgman is a candy manufacturer who uses noisy machines. Sturges is a doctor next door who is affected by the noise from Bridgman's candy production. The court has granted Sturges the right to prevent Bridgman from using his machinery. Assume that the transaction costs required for Bridgman and Sturges to get together and bargain are negligible.

Statement: In this scenario, Bridgman will not be allowed to use his machinery.

Question 13

In Figure F, MPC represents the marginal private cost of car production and MSC represents the marginal social cost of car production, both measured in GBP.

Statement: To reduce output to 80, the producer's minimum acceptable payment would be £1,000.

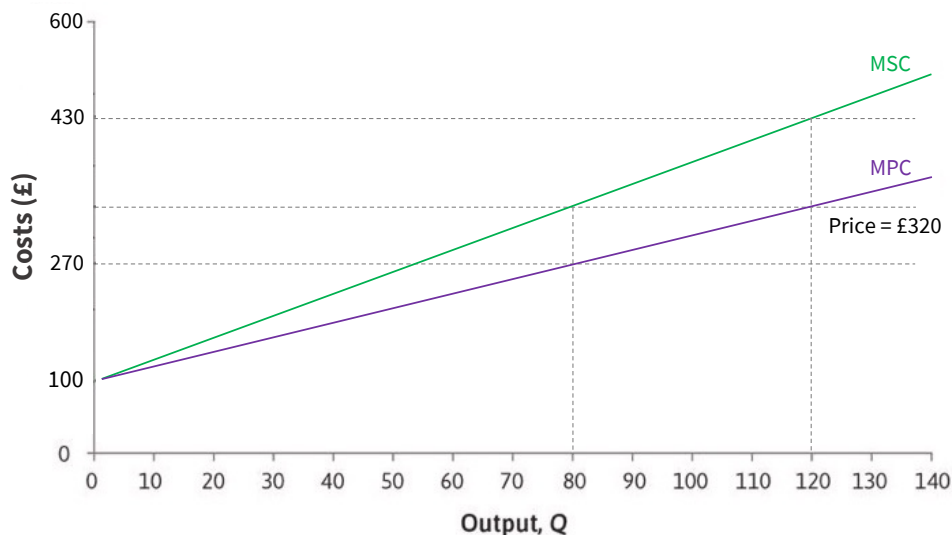


Figure F. The car factory's production decision (Question 13).