1.6 Rational Decision Making and the Theory of Diminishing Marginal Utility

AQA 7136 · Calculators not allowed · about 60 minutes · Write-in edition

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer all questions. Full sentences are required for Q1, Q2, Q6, Q10, Q11 and Q13. Do simple arithmetic without a calculator where asked. Show working for calculations.

1 Equi-marginal principle: Two goods A and B. Explain in full sentences how a consumer with a fixed budget will allocate spending between A and B to maximise total utility, using the equi-marginal principle ($MU_A / P_A = MU_B / P_B$). Include a brief example with numbers: $MU_A = 10$ utils, $P_A = 2$, $MU_B = 6$ utils, $P_B = 1$.

(Total for Question 1 is 4 marks)

2 Assess briefly two strengths and two weaknesses of using marginal utility theory to explain individual demand, in the context of a consumer deciding how many cinema tickets to buy. Give concise points and a one-sentence development for each point.

(Total for Question 2 is 7 marks)

3 Evaluate the view that the rational decision-making assumption in traditional microeconomics provides a good description of how consumers make choices. In your answer, consider strengths of the rational model, its limitations (including the law of diminishing marginal utility and equi-marginal principle), and the extent to which these limitations matter for economic analysis. You should use diagrams where appropriate and give a supported judgement.

(Total for Question 3 is 12 marks)

4 State the law of diminishing marginal utility as it applies to successive units of a single good consumed by an individual, for example cups of tea consumed during a morning.

(Total for Question 4 is 1 mark)

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5 Table A: Units of chocolate bars consumed by one person in a day, with Total Utility (TU) given. Complete the Marginal Utility (MU) column and state at which unit diminishing marginal utility first appears. Table A: Units 0 to 5; TU (utils) = 0, 12, 22, 30, 36, 40 for 0,1,2,3,4,5 units respectively.

(Total for Question 5 is 5 marks)

6 Table B: Units of bottled water consumed on a hot afternoon. Complete the MU column and identify at which unit MU becomes zero or negative. Table B: Units 0 to 5; TU (utils) = 0, 8, 15, 21, 24, 24 for 0,1,2,3,4,5 units respectively.

(Total for Question 6 is 5 marks)

7 Deriving an individual demand curve from marginal utility: Explain briefly how the concept of marginal utility can be used to determine the price an individual is willing to pay for each successive unit of a good, including the role of the law of diminishing marginal utility.

(Total for Question 7 is 5 marks)

Mark scheme · 1.6 Rational Decision Making and the Theory of Diminishing Marginal Utility

Question 1

states the equi-marginal condition: $MU_A / P_A = MU_B / P_B$ for utility maximisation given a budget	**M1**
applies the numbers: $MU_A / P_A = 10/2 = 5$; $MU_B / P_B = 6/1 = 6$	**M1**
concludes that $MU_B / P_B > MU_A / P_A$, so the consumer should buy more of B and less of A to increase total utility per pound spent	**A1**
explains final allocation condition: the consumer reallocates spending until MU_A / P_A rises or MU_B / P_B falls into equality, or until budget is exhausted	**A1**

Answer: Since 10/2 = 5 and 6/1 = 6, B gives more utility per pound, so the consumer should buy more of B and less of A until $MU_A/P_A = MU_B/P_B$ or budget exhausted.

Question 2

strength 1: MU theory provides a clear, intuitive explanation of downward-sloping demand via diminishing MU	**B1**
develops strength 1: diminishing MU explains why willingness to pay falls for successive tickets, mapping to a demand curve	**A1**
strength 2: MU framework links price and quantity through a simple rule (buy while MU ≥ price), useful for pedagogic and analytical clarity	**B1**
develops strength 2: the MU ≥ price rule helps predict discrete purchase decisions and marginal analysis in many market situations	**A1**
weakness 1: MU is ordinal and hypothetical, utils are unobservable and interpersonal comparisons are problematic	**B1**
develops weakness 1: this limits empirical testing and policy application because MU values cannot be measured directly across individuals	**A1**
weakness 2: the model assumes consistent, calculating consumers, ignoring contexts where habit, time pressure or heuristics drive behaviour	**B1**

Answer: Two strengths: clear explanation of downward-sloping demand via diminishing MU, and a simple purchase rule MU ≥ price. Two weaknesses: MU is unobservable and interpersonal comparisons are difficult, and the model assumes calculating rational consumers ignoring habits and heuristics.

Question 3

Level 1 Basic statements about rational decision-making with limited or no application, weak structure, little or no use of diagram, and a simple unbalanced judgement	**1-4**
Level 2 Clear explanation of strengths and limitations of the rational model, some use of examples or a diagram, and a balanced discussion with a tentative conclusion	**5-8**
Level 3 Comprehensive analysis of the rational decision-making assumption, well-developed evaluation of limitations and their significance, effective use of diagrams and examples, and a clearly justified and supported judgement	**9-12**

Indicative content:

- Strengths: provides a coherent, parsimonious framework for predicting consumer responses to prices and incomes; yields testable comparative statics such as the MU >= price rule and equi-marginal principle; the law of diminishing MU explains downward-sloping individual demand and helps derive market demand when aggregated
- Use of diagrams: marginal utility schedules mapped to willingness-to-pay points that trace a downward-sloping individual demand curve; equi-marginal allocation between two goods shown by MU/P equalisation
- Limitations: utils are hypothetical and unobservable, interpersonal comparisons problematic; assumptions of complete information, transitive and stable preferences, and unbounded computation are unrealistic in many everyday choices
- Behavioural considerations: habits, heuristics, bounded rationality and time-inconsistent preferences can lead to systematic deviations from utility-maximising choices, though these are reserved for the behavioural pack, mention as boundary
- Magnitude and context: discuss when the rational model works well (high-stakes, infrequent decisions, markets with clear prices) and when it is weaker (habitual small purchases, complex multi-attribute goods), including policy implications
- Evaluation: weigh model simplicity and predictive power against realism; consider whether relaxing assumptions (e.g. satisficing, fuzzy preferences) preserves useful predictions; conclude with a supported view on the continued usefulness of the rational model for many economic analyses, while acknowledging important limits for some contexts

Question 4

as more units of a good are consumed, the marginal utility of each additional unit eventually falls, holding other factors constant	**B1**

Answer: As more units are consumed, the marginal utility of each additional unit eventually decreases, ceteris paribus.

Question 5

MU for 1st unit = 12 - 0 = 12 utils	**M1**
MU for 2nd unit = 22 - 12 = 10 utils	**M1**
MU for 3rd unit = 30 - 22 = 8 utils	**M1**
MU for 4th unit = 36 - 30 = 6 utils	**M1**
identifies point of diminishing marginal utility appears after the 1st unit, since MU falls from 12 to 10 on the second unit, so diminishing MU begins at the 2nd unit (or 'from the 2nd unit onward')	**B1**

Answer: MU column: 1st 12, 2nd 10, 3rd 8, 4th 6, 5th 4. Diminishing MU first appears at the 2nd unit (MU falls compared with previous unit).

Question 6

MU for 1st unit = 8 - 0 = 8 utils	**M1**
MU for 2nd unit = 15 - 8 = 7 utils	**M1**
MU for 3rd unit = 21 - 15 = 6 utils	**M1**
MU for 4th unit = 24 - 21 = 3 utils	**M1**
MU for 5th unit = 24 - 24 = 0, so MU becomes zero at the 5th unit (identifies zero correctly)	**B1**

Answer: MU column: 1st 8, 2nd 7, 3rd 6, 4th 3, 5th 0. MU becomes zero at the 5th unit; it does not go negative in this table.

Question 7

identifies that the price an individual is willing to pay for a unit is related to the marginal utility of that unit, since willing-to-pay equals the monetary equivalent of MU	**M1**
explains that as MU falls with successive units (diminishing MU), the maximum willingness to pay falls too	**M1**
links this to a downward-sloping individual demand curve, with each point reflecting the price equal to MU for that unit	**A1**
mentions that at market price P the consumer buys units where MU ≥ P and stops when MU < P, showing quantity demanded depends on price	**B1**
briefly notes the role of income/budget constraint: willingness to pay also constrained by the consumer's budget, so actual demand equals MU-price comparisons within budget	**B1**

Answer: The individual is willing to pay up to the MU of each unit; diminishing MU means willingness to pay falls with each unit, producing a downward-sloping demand curve. Consumer buys units while MU ≥ market price, subject to budget constraints.