

SECTION B: Microeconomics

Candidates should answer **ONE** of the following long questions. It is essential that you explain your answers.

Question 11

A firm manufactures quad bikes (“quads”). Each quad is made using one frame (x_1) and four wheels (x_2). Each frame costs £10 and each wheel costs £4. The output of the firm can hence be represented by the function

$$\min \left[x_1, \frac{1}{4} x_2 \right]$$

(Hint: this is similar to working with $\min \left[K, \frac{1}{4} L \right]$, but instead of considering prices r and w you may consider prices p_1 and p_2 for the inputs)

- a) What is an isoquant? Show the isoquants for producing two quads, three quads and seven quads. [5 marks]
- b) Derive the input demands for frames and wheels for the firm. How do they depend on the input prices? What is the maximum number of quads the firm can produce if the number of wheels is fixed at 12? Assume that the firm is producing the maximum number of quads. What is the marginal product of adding an extra frame? [10 marks]
- c) Define the firm’s cost function and derive it. Assume that each wheel costs £4 and each frame costs £10. What is the cost of producing 7 quads? [5 marks]
- d) Assume that the firm needs to pay £50 per day to rent the factory to produce quads (this is a fixed cost). Continue to assume that each wheel costs £4 and each frame costs £10. Suppose that the firm can only produce 10 quads per day and the rent has already been paid for today. If the price at which the firm can sell quads is £30 should the firm produce today? Explain your reasoning. [5 marks]
- e) Continue to assume that the daily rent is £50, each wheel costs £4 and each frame costs £10. Suppose that the firm can only produce 10 quads per day and the rent can be stopped (so the cost of producing zero quads is zero). If the price at which the firm can sell quads is £30 should the firm produce today? Explain your reasoning. [5 marks]