

3.3 Long-Run Production Costs

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS economies of scale 规模经济 • diseconomies of scale 规模不经济
 • minimum efficient scale 最小有效规模 • total cost 总成本 • long run 长期

Objective

Build the skills to answer exam questions on **long-run production costs**.

You must be able to:

- explain that all inputs are variable in the **long run**, so there are no fixed costs
- describe the **long-run average total cost (LRATC)** 长期平均总成本 curve
- identify **economies of scale** 规模经济, constant returns, and **diseconomies of scale** 规模不经济
- define the **minimum efficient scale** 最小有效规模

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ The long run

All inputs are variable, so there are **no fixed costs**. LRATC is the **envelope** of the short-run cost curves.

■ Returns to scale

- **Economies of scale** — LRATC **falls** as output rises.
- **Constant** returns — LRATC flat.
- **Diseconomies of scale** — LRATC **rises**.

■ Minimum efficient scale

The **lowest** output at which LRATC reaches its minimum.

2 Practice

2.1 State why there are no fixed costs in the long run. [1]

2.2 Define economies of scale. [1]

2.3 State what happens to LRATC when a firm has diseconomies of scale. [1]

3 Exam-style questions

3.1 Economies of scale occur when, as output rises, LRATC [1]

- **A** rises
- **B** falls
- **C** stays constant
- **D** is zero

3.2 The minimum efficient scale is the lowest output at which [1]

- **A** ATC is maximized
- **B** LRATC is minimized
- **C** MC is zero
- **D** profit is zero

3.3 A firm doubles all its inputs and finds that output **more than** doubles.

(a) Name what the firm is experiencing. [1]

(b) State what happens to LRATC. [1]

(c) State one source of economies of scale. [1]

Solutions

2.1 all inputs are variable, so none are fixed.

2.2 falling long-run average total cost as output rises.

2.3 it rises.

3.1 B.

3.2 B.

3.3 (a) economies of scale (increasing returns to scale). (b) it falls. (c) any one of: specialization of labour, bulk buying, spreading fixed costs.