6.1 The Short Run and the Long Run

1. Variable factors are the factors of production that change in quantity as output changes, while fixed factors are the factors of production that do not change in quantity as output changes.

2. In the short run, there are *(both fixed factors and variable factors / only fixed factors / only variable factors)*.

3. In the long run, there are *(both fixed factors and variable factors / only fixed factors / only variable factors)*.

4. In the short run, which of the following is/are (a) fixed factor(s) of a coffee shop? Tick (✓) the appropriate box(es).

☐ Coffee beans
☑ Coffee machine
☑ Accountant

6.2 Input-output Relationship in the Short Run

5. The following table shows the input-output relationship of a firm. Complete the table.

Machine (units)	Labour (units)	Total product (units)	Average product (units)	Marginal product (units)
1	3	30	30	30
2	3	70	35	40
3	3	120	40	50
4	3	168	42	48

6. State the law of diminishing marginal returns.

The law of diminishing marginal returns states that in the short run, as more units of a variable factor are added to a given quantity of fixed factor successively, marginal product will decrease eventually, other things being constant.

7. The following table shows the input-output relationship of a firm.

Machine (units)	Labour (units)	Average product (units)
5	1	50
5	2	75
5	3	100
5	4	100
5	5	90

(a) The factory is operating in the *(short run / long run)*.

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(b) Machine is a *(fixed factor / variable factor)* while labour is a *(fixed factor / variable factor)*.

(c) Diminishing marginal returns sets in when the 4th unit of labour is put to work.

8. Determine if each of the following statements is true or false. Circle the correct answer.

(a) When diminishing marginal returns sets in, total product will decrease.	*(True / False)*
(b) When all factors of production are variable factors, the law of diminishing marginal returns is not applicable.	*(True / False)*

6.3 Cost of Production

9. Variable costs are the costs that change as output changes, while fixed costs are the costs that do not change as output changes.

10. The table below shows the cost-output relationship of a firm. There is a fixed cost of $18. Complete the table.

Output (units)	Total cost ($)	Average cost ($)	Marginal cost ($)
1	42	42	24
2	64	32	22
3	78	26	14
4	88	22	10

6.4 Economies and Diseconomies of Scale

11. After a firm opening several branches, its average production cost decreases. The firm *(enjoys internal economies of scale / enjoys external economies of scale / suffers from internal diseconomies of scale / suffers from external diseconomies of scale)*.

12. Give **TWO** reasons to explain why an increase in a firm's production scale may cause a decrease in its average cost.

lower buying costs / lower cost of borrowing / more resources for research and development / usage of more advanced machinery / higher degree of or more extensive specialisation / wider spread of marketing expenses / lower cost in managing risks (OR any reasonable answers) (Any two)

13. Give **TWO** reasons to explain why an increase in a firm's production scale may cause an increase in its average cost.

communication problems / difficulties in management / huge administrative cost / higher marketing expenses / higher cost of borrowing / higher cost of purchase (OR any reasonable answers) (Any two)

14. Give **TWO** reasons to explain why the expansion of an industry may cause a

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decrease in long run average cost of firms in the industry.

higher accessibility / availability of educated labour / lower sourcing costs / lower marketing expenses (OR any reasonable answers) (Any two)

15. Give **TWO** reasons to explain why the expansion of an industry may cause an increase in long run average cost of firms in the industry.

higher labour costs / higher rental costs / more environmental problems / saturation of existing market (OR any reasonable answers) (Any two)

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