

9.3 Operations strategy

Name: _____ Class: _____ Date: _____ Total: 29 marks

KEY WORDS critical path 关键路径 • total float 总浮动时间
• critical path analysis 关键路径分析 • lean production 精益生产 • capacity management 产能管理

Objective

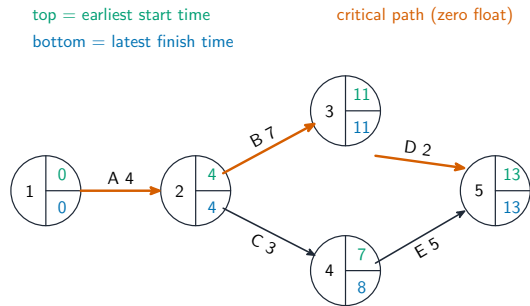
Build the skills to answer exam questions on **operations strategy** 运营战略 — **lean production** 精益生产, **capacity management** 产能管理, and **critical path analysis** 关键路径分析 (CPA), including **total float** 总浮动时间.

You must be able to:

- explain lean production and capacity management
- calculate **total float** and identify the critical path
- analyse and evaluate the usefulness of CPA

1 Worked examples

■ Critical path analysis



Each node shows the earliest start (EST) and latest finish (LFT) time

$$\text{total float} = \text{LFT} - \text{duration} - \text{EST}$$

- **Worked:** LFT 12, duration 4, EST 5 $\rightarrow$ total float = $12 - 4 - 5 = 3$ days.
- **Critical path:** the chain of activities with **zero** float — they cannot be late or the project is late.

- **Lean production:** make products with the least waste (just-in-time, continuous improvement).

Answer shapes: AO1 + AO2 + AO3 (reasoning chain) + AO4 (a supported judgement *in context*).

2 Practice

2.1 Define the term *lean production*. [2]

2.2 An activity has an LFT of 14, a duration of 6 and an EST of 5. Calculate its total float. [2]

2.3 Define the term *critical path*. [2]

3 Exam-style questions

3.1 Explain one benefit to a business of using **lean production**. [3]

3.2 Analyse two benefits to a business of using **critical path analysis** to plan a project.[8]

3.3 Evaluate the usefulness of critical path analysis to a business managing a complex project. [12]

Solutions

Business answers are marked by **level of response** against the assessment objectives: award **AO1** knowledge, **AO2** application, **AO3** analysis and **AO4** evaluation.

2.1 producing goods with the least possible waste of time, materials, space and effort (2 for a clear definition; 1 for a partial idea).

2.2 total float = $14 - 6 - 5 = 3$ (2; award 1 for a correct method with the wrong figure).

2.3 the chain of activities with zero float, which sets the minimum time the project can take (2 for a clear definition; 1 for a partial idea).

3.1 [3] **AO1** 1 — name a benefit (lower costs; less waste; less money tied up in stock; higher quality). **AO2** up to 2 — develop it, e.g. less waste of materials → lower cost per unit → higher profit or lower prices (2 developed / 1 limited).

3.2 [8] For **each** of two benefits: **AO1** 1 + **AO2** 1 + **AO3** up to 2. Example chains — *find critical tasks*: CPA shows which tasks have zero float → managers focus resources on them → the project is less likely to be late. *Order resources on time*: knowing each task's earliest start → materials and labour arrive just when needed → lower holding cost and no idle time. Maximum 4 per benefit, 8 total.

3.3 [12] **AO1** 2 / **AO2** 2 / **AO3** 2 / **AO4** up to 6. **Useful**: shows the shortest project time, the critical tasks and where spare time (float) exists, helping plan resources and spot delays. **Limited**: it is only as good as the time estimates, cannot show quality or cost, and a complex network is hard to manage if conditions change. Judgement: CPA is valuable for planning a large project's time and resources, but it must use realistic estimates and be combined with cost and quality judgement — its usefulness depends on the accuracy of the data.