

## Case study 15: Mark scheme

Chapter 35: Innovation (HL only)

Chapter 37: Project management (HL only)

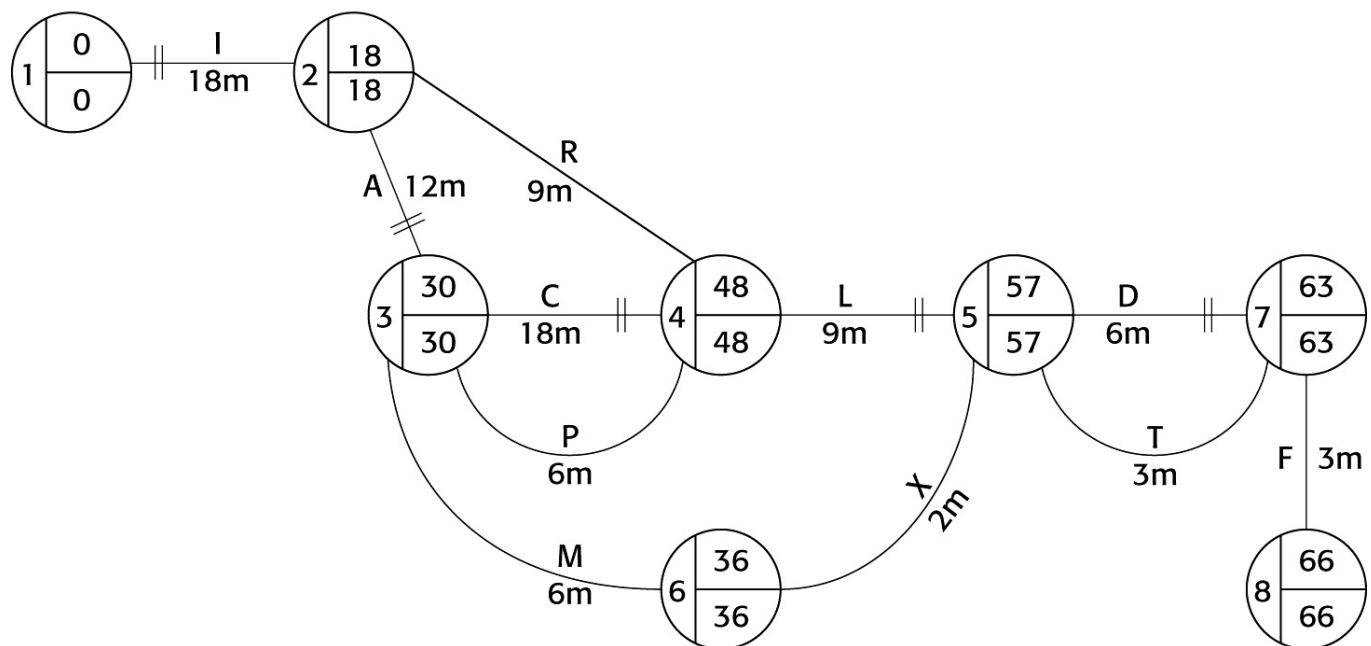
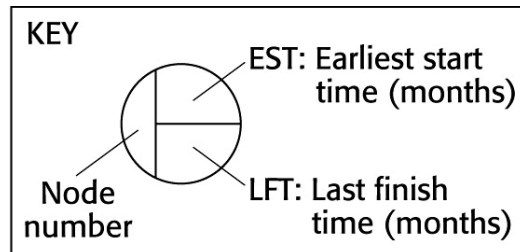
### Louis Pharmaceuticals plc (LPP)

LPP is a multinational pharmaceutical company specialising in anti-cancer drugs. Ama Ngwe, head of their R&D department, was in charge of scheduling new products from inception to final production and distribution. Scientists had made proposals for research into development of a new lung cancer drug, provisionally called Oncopul. Ama had to set deadlines for all personnel concerned in order to coordinate the project. She drew up the following planning schedule, and had been asked by senior management to give an estimated date by which the drug could finally be launched into the market.

Job category	Timing (months)	Preceded by
I: Initial research	18	
R: Registration of patent	9	I
A: Animal testing	12	I
C: Clinical testing	18	A
P: Licence pre-applications	6	A
L: Licence applications	9	R, C, P
M: Marketing mix planning	6	A
X: Package design	2	M
D: Promotion campaign	6	X, L
T: Trial release programme	3	L, X
F: Full release programme	3	T, D

**HL questions: 25 marks, 45 minutes**

- 1 Draw the critical path network for Oncopul, with EST and LFT clearly shown on each node and the critical path clearly labelled. (10)

**10 marks:**

A correct CPA with the critical path, ESTs and LFTs clearly marked and a key included. The direction of the dependency of the dummy activity is correctly marked in the direction  $F \rightarrow C$ .

**8–9 marks:**

Up to two minor errors, but the dummy activity is recognised. No more than 8 marks to be given if the dummy activity is represented by activities converging on a single node.

**6–7 marks:**

Up to three errors – 6 marks maximum if there is no key.

**4–5 marks:**

CPA with no key and/or four or more errors.

**2–3 marks:**

The candidate demonstrates understanding of the basic idea of drawing a CPA but displays little understanding of the principles involved in calculating EST or LFT.

**1 mark:**

CPA attempted.

- 2 Which activity may be delayed most without delaying the total project duration? (6)

\*Total float = LFT – duration – EST

Float is only possible along the non-critical paths T, X, M, P.

Activity	EST	LFT	Duration (months)	Total float*
T	57	63	3	3
X	36	57	2	9
M	30	36	6	0
P	30	48	6	12
R	18	48	9	21

R can be delayed by 21 months without delaying the total project duration.

**6 marks:**

Totally correct working with all calculations fully evident from answer.

**4–5 marks:**

One error or calculations not fully evident.

**2–3 marks:**

Two or three errors, but some logic evident.

**1 mark:**

Attempt at calculations.

- 3 Explain **two** disadvantages of investment in research and development for a company like LPP. (4)

- R&D expense does not always result in a marketable product
- opportunity cost of R&D, e.g. spending more on marketing existing products
- other companies may invent something better or sooner
- ethical issues may interfere with selling the new product
- any other relevant point

**4 marks:**

Detailed explanation, linked to case study and using business terminology.

**2–3 marks:**

Partial explanation. For only one disadvantage explained, give a maximum of 2 marks.

**1 mark:**

One statement, not explained or linked to case study.

Apply **Resources table 3b** mark band descriptors.

**4** LPP plan to patent Oncopul. Explain **two** advantages of this to LLP. **(5)**

Define patent: the right to be the sole producer and seller of an invention for a certain period of time. Establishing a patent can take several months because a patent lawyer has to search all similar patents to check that the new registration does not infringe existing patents.

- Patent protection would allow LPP to produce Oncopul for a specific period of time without other companies being able to copy the product. This would enable them to recoup the R&D costs using price skimming before having to adjust to competition pricing. This is extremely important because R&D costs for new drugs are often extremely high.
- It could enable LLP to have a licensing agreement with other companies, whereby the other companies could produce the drug under the patent. This would provide more income for LLP without the necessity of using their own production facilities or investing in new production facilities. It would therefore be an extra way of recouping the development costs.

HL: apply **Resources table 2** mark band descriptors.