1.16 Production Planning and Costs: 30-minute Pack

AQA 8552 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

1 A firm needs 500 identical tags. Method P has a setup cost of £40 once per order and costs £0.90 per tag. Method Q has a setup cost of £8 per batch of 100 tags and costs £0.72 per tag. Setup is charged once for each batch; no production runs in parallel. Decide which has the lower total cost and state the saving.

(Total for Question 1 is 4 marks)

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2 A community group orders 37 identical stools. Option S makes one at a time: setup 10 minutes once and 22 minutes per stool. Option B makes batches of 12: setup 30 minutes per batch and 16 minutes per stool. One workstation is available, parallel work is not allowed, and 15 hours are available. For B, a final partial batch is allowed and still needs a full setup. Decide which option meets the time limit and is quicker.

(Total for Question 2 is 4 marks)

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3 A school orders 80 identical plywood storage trays. The workshop can use a reusable cutting jig, but making each tray individually would need repeated measuring. After this order, the workshop must return to making other products on the same equipment. Explain why batch production may suit this order.

(Total for Question 3 is 4 marks)

4 A company receives a forecast for 12,000 identical cable clips each month for a year. A dedicated production line would need substantial setup investment. Explain why larger-scale production could be economical, and give one reason the company should still check before choosing it.

(Total for Question 4 is 4 marks)

5 A maker has an order for 45 personalised name plaques, each with different text. Explain why a single large-scale automated run may not be the best choice, even though the total quantity is 45.

(Total for Question 5 is 4 marks)

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6 A batch of 40 wooden hooks needs a setup time of 35 minutes, then a cycle time of 4 minutes per hook. Setup occurs once for the whole batch. Calculate the total production time in minutes.

(Total for Question 6 is 3 marks)

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7 A small laser-cut order has a setup charge of £18 once per order and a material cost of £2.40 per unit. Calculate the total cost for 25 units and the cost per unit.

(Total for Question 7 is 3 marks)

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Mark scheme · 1.16 Production Planning and Costs: 30-minute Pack

Question 1

P total = £40 + 500 x £0.90 = £490	**B1**
Q requires 5 batches and setup costs 5 x £8 = £40	**B1**
Q total = £40 + 500 x £0.72 = £400	**B1**
Q is cheaper by £490 - £400 = £90	**B1**

Answer: Method Q costs £400; P costs £490. Q saves £90.

Question 2

S time = 10 + 37 x 22 = 824 minutes	**B1**
B requires ceiling(37 / 12) = 4 batches, including a partial final batch	**B1**
B time = 4 x 30 + 37 x 16 = 712 minutes	**B1**
both are below 900 minutes and B is quicker by 112 minutes	**B1**

Answer: Both meet 900 minutes. S takes 824 minutes; B takes 712 minutes because four setups are needed. B is quicker by 112 minutes.

Question 3

80 identical trays can share the same jig setup	**B1**
batching reduces repeated measuring or setup	**B1**
the setup cost/time is spread across many trays	**B1**
the finite batch can stop after 80 trays and the equipment can be changed over to other products	**B1**

Answer: The 80 identical trays can share one jig setup, avoiding repeated measuring for each tray. The setup effort is spread across 80 units, reducing setup effort per tray. Once the batch is complete, the workshop can change over the equipment to make the other products.

Question 4

large repeated quantity can spread the dedicated setup cost over many units	**B1**
a specialised line may reduce time or cost per unit after setup	**B1**
the forecast is repeated over a year, supporting continued use	**B1**
check demand certainty or setup investment/recovery before committing	**B1**

Answer: A dedicated line could spread its setup investment over many clips and reduce later unit cost. The company should check that the forecast is reliable enough to recover the investment.

Question 5

the order contains different personalisation rather than identical units	**B1**
large-scale setup may be designed for repeated identical output	**B1**
changing settings or handling each variation can add time/cost	**B1**
a small batch or individually made plaques may fit the order better	**B1**

Answer: The 45 plaques are not identical because each has different text. Repeated changes may add time and cost, so small batches or individual production may fit better than one large-scale run.

Question 6

40 x 4 = 160 minutes of cycle time	**M1**
adds setup once: 160 + 35	**M1**
195 minutes	**M1**

Answer: 195 minutes

Question 7

variable cost = 25 x £2.40 = £60	**M1**
total cost = £60 + £18 = £78	**M1**
unit cost = £78 / 25 = £3.12	**M1**

Answer: Total £78; £3.12 per unit

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