Cambridge Assessment International Education

Interactive

Interactive Example Candidate Responses

Paper 5 (May / June 2016), Question 2

Cambridge IGCSE™
Physics 0625

Version 2.0

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HIGH | MIDDLE | LOW

2 In this experiment, you will investigate the cooling of water.

(a)
- Pour 100 cm^3 of the hot water provided into beaker **A**.
- Measure the temperature θ_H of the water in beaker **A**.

θ_H = 86°C

- Pour 100 cm^3 of the cold water provided into beaker **B**.
- Measure the temperature θ_C of the water in beaker **B**.

θ_C = 30°C

- Calculate the average temperature θ_{AV} using the equation $\theta_{AV} = \frac{\theta_H + \theta_C}{2}$.

$\frac{86 + 30}{2}$

θ_{AV} = 58°C [3]

(b) Add the water from beaker **B** to the hot water in beaker **A**. Stir briefly.

Measure the temperature θ_M of the mixture.

θ_M = 51°C [1]

(c) State one precaution that you took to ensure that the temperature readings are as reliable as possible.

Make sure that I take the readings from eye level to prevent parallex error [1]

Your Mark	
2(a)	
2(b)	
2(c)	
2(d)(i)	
2(d)(ii)	
2(d)(iii)	
2(d)(iv)	

Q2	Mark scheme
(a)	θ_H 60 – 100 θ_C 10 – 40 and θAV correct Unit °C
(b)	θ_M between θ_H and θ_C
(c)	Perpendicular viewing of scale OR wait until temperature stops rising OR carry out without undue delay between parts
(d)(i)	Correct diagram with lid Insulation placed round beaker
(d)(ii)	Sensible series of values with θ_M between θ_H and θ_C
(d)(iii)	Statement and justification to match results
(d)(iv)	Two from: Room temperature (or other environmental condition) Temperature of cold water Temperature of hot water Volumes of water Size/shape/material/surface area of beaker

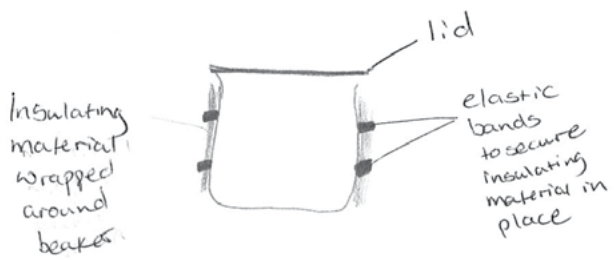
EXAMINER COMMENTS | MARK SCHEME

(d) Empty both beakers.

You are provided with

- a lid, with a hole for the thermometer,
- some insulating material,
- two elastic bands.

(i) In the space below, draw a labelled diagram to show how you will use these items to reduce the loss of thermal energy when the procedure is repeated.



[2]

(ii) Using the improvements shown in your diagram, repeat the procedure in parts **(a)** and **(b)**.

θ_H = ~~62°~~ 73°C

θ_C = 31°C

θ_{AV} = 52°C

θ_M = 50°C

[1]

(iii) Comment on whether the improvements made to the apparatus have significantly changed the value of the temperature θ_M. Use your results to justify your answer.

~~No~~ The value of θM has not significantly changed, because there is only a 1°C difference between both experiments [1]

(iv) Suggest two conditions that should be kept constant for all parts of this experiment.

1. The amount of water used

2. The ~~external environment~~ room temperature must be maintained

[2]

[Total: 11]

Select page

HIGH | MIDDLE | LOW

	Your Mark
2(a)	
2(b)	
2(c)	
2(d)(i)	
2(d)(ii)	
2(d)(iii)	
2(d)(iv)	

Q2	Mark scheme
(a)	θ_H 60 – 100 θ_C 10 – 40 and θAV correct Unit °C
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EXAMINER COMMENTS | MARK SCHEME

Select page

HIGH | MIDDLE | LOW

2 In this experiment, you will investigate the cooling of water.

(a)
- Pour 100 cm^3 of the hot water provided into beaker **A**.
- Measure the temperature θ_H of the water in beaker **A**.

θ_H = 66°C ✓

- Pour 100 cm^3 of the cold water provided into beaker **B**.
- Measure the temperature θ_C of the water in beaker **B**.

θ_C = ~~33°C~~ 32°C ✓

- Calculate the average temperature θ_{AV} using the equation $\theta_{AV} = \frac{\theta_H + \theta_C}{2}$.

$\frac{66+33}{2}$ ≠

$\frac{66+32}{2} = 49$

θ_{AV} = 49°C ✓

[3]

(b) Add the water from beaker **B** to the hot water in beaker **A**. Stir briefly.

Measure the temperature θ_M of the mixture. ✓

θ_M = 47°C [1]

(c) State one precaution that you took to ensure that the temperature readings are as reliable as possible.

I tried to avoid parallex error when pouring water into the measuring cylinder ✗ [1]

	Your Mark
2(a)	
2(b)	
2(c)	
2(d)(i)	
2(d)(ii)	
2(d)(iii)	
2(d)(iv)	

Q2	Mark scheme
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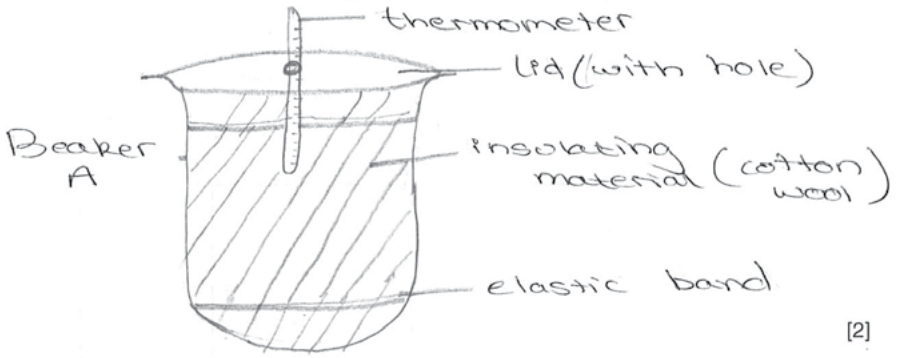
EXAMINER COMMENTS | MARK SCHEME

(d) Empty both beakers.

You are provided with

- a lid, with a hole for the thermometer,
- some insulating material,
- two elastic bands.

(i) In the space below, draw a labelled diagram to show how you will use these items to reduce the loss of thermal energy when the procedure is repeated.



[2]

(ii) Using the improvements shown in your diagram, repeat the procedure in parts **(a)** and **(b)**.

$\frac{69 + 33}{2} = 51$

θ_H = 69°C

θ_C = 33°C

θ_{AV} = 51°C

θ_M = 50°C

[1]

(iii) Comment on whether the improvements made to the apparatus have significantly changed the value of the temperature θ_M. Use your results to justify your answer.

Yes they have θ_M without insulation was 47°C and θ_M with insulation was 50°C. Heat loss with insulation is more. [1]

(iv) Suggest two conditions that should be kept constant for all parts of this experiment.

1. The initial ~~tem~~ room temperature
2. The volume of water added

[2]

[Total: 11]

Select page

HIGH | MIDDLE | LOW

	Your Mark
2(a)	
2(b)	
2(c)	
2(d)(i)	
2(d)(ii)	
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EXAMINER COMMENTS | MARK SCHEME

Select page

HIGH | MIDDLE | LOW

2 In this experiment, you will investigate the cooling of water.

(a)
- Pour 100 cm^3 of the hot water provided into beaker **A**.
- Measure the temperature θ_H of the water in beaker **A**.

θ_H = 78°

- Pour 100 cm^3 of the cold water provided into beaker **B**.
- Measure the temperature θ_C of the water in beaker **B**.

θ_C = 32°

- Calculate the average temperature θ_{AV} using the equation $\theta_{AV} = \frac{\theta_H + \theta_C}{2}$.

$\theta_{AV} = \frac{78 + 32}{2}$

$\theta_{AV} = 55$

θ_{AV} = 55° [3]

(b) Add the water from beaker **B** to the hot water in beaker **A**. Stir briefly.

Measure the temperature θ_M of the mixture.

θ_M = 52° [1]

(c) State one precaution that you took to ensure that the temperature readings are as reliable as possible.

keep room temperature constant. Use the same ~~of~~ volume of water for both hot and cold water [1]

	Your Mark
2(a)	
2(b)	
2(c)	
2(d)(i)	
2(d)(ii)	
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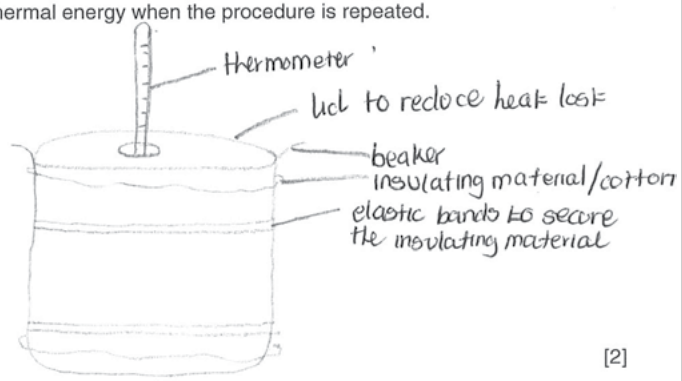
EXAMINER COMMENTS | MARK SCHEME

(d) Empty both beakers.

You are provided with

- a lid, with a hole for the thermometer,
- some insulating material,
- two elastic bands.

(i) In the space below, draw a labelled diagram to show how you will use these items to reduce the loss of thermal energy when the procedure is repeated.



[2]

(ii) Using the improvements shown in your diagram, repeat the procedure in parts **(a)** and **(b)**.

θ_H = 77°

θ_C = 32°

θ_{AV} = 54.5°

θ_M = 56°

[1]

(iii) Comment on whether the improvements made to the apparatus have significantly changed the value of the temperature θ_M. Use your results to justify your answer.

56 − 52 × 100 = 7.14%, ~~Yes it has No it has~~
56 Yes it has changed the value, because it
~~it's chang~~ increased by 4° from 52° to 56° [1]

(iv) Suggest two conditions that should be kept constant for all parts of this experiment.

1. Initial temperature
2. room temperature

[2]

[Total: 11]

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2(c)	
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