

Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic : Practical Skills

Name of the Student: _____

Max. Marks : 27 Marks

Time : 27 Minutes

Q1.

(a) A student made measurements to determine if some gold coins were made from pure gold. The coins that were available to the student are shown below.



(Source: © Bjoern Wylezich/Shutterstock)

The student used digital calipers to measure the thickness t and the diameter d of one of the coins.

(i) Calculate the volume V of the coin, and the percentage uncertainty in V .

$$t = 1.54 \text{ mm}$$

$$d = 22.16 \text{ mm}$$

(7)

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$$V = \text{.....}$$

$$\text{Percentage uncertainty in } V = \text{.....}$$

(ii) The student measured the mass of the coin using an electronic balance.

The balance had a resolution of 0.1 g.

Assess whether the coin could be made from pure gold.

$$\text{density of pure gold} = 1.93 \times 10^4 \text{ kg m}^{-3}$$

$$\text{mass of coin} = 11.2 \text{ g}$$

(4)

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(b) The student's experimental method could have been improved.

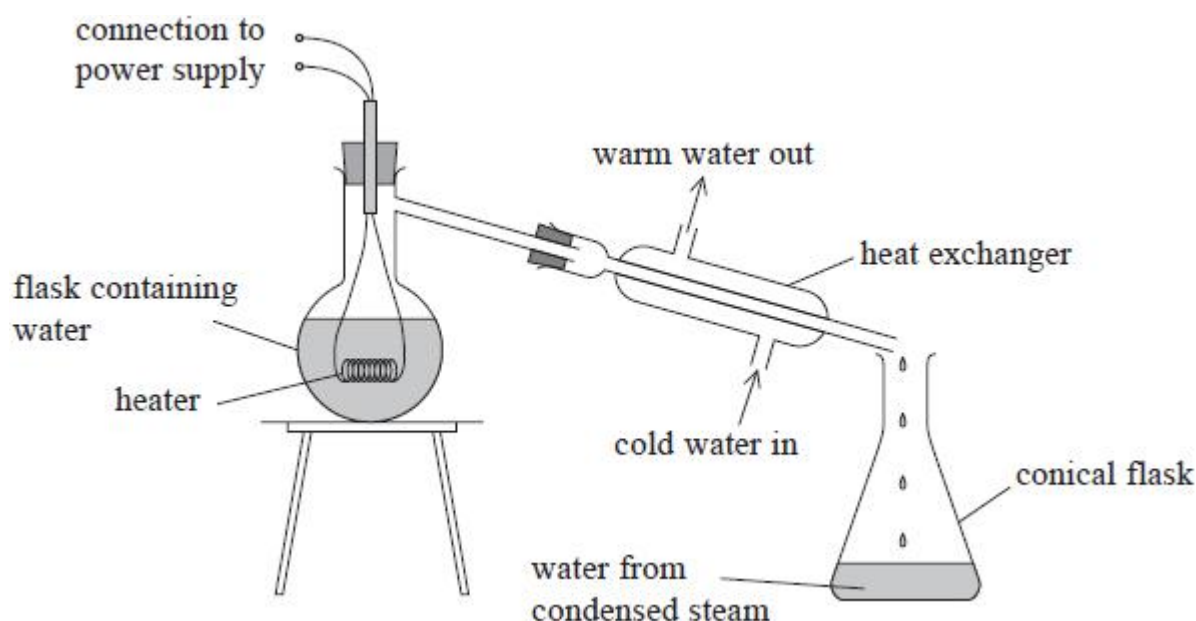
Explain two changes the student could have made to the experimental method.

(4)

(Total for question = 15 marks)

Q2.

The apparatus shown can be used to determine a value for the specific latent heat of vaporisation of water.



(a) In one experiment the current in the heater was 8.20 A, and the potential difference across the heater was 230 V.

(i) Show that the power of the heater was about 2 kW.

(2)

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- (ii) There was 0.655 kg of water in the flask at an initial temperature of 22.5 °C.
The heater was switched on, and the water in the flask was heated to boiling point.

Calculate the minimum time taken for the water to be heated to 100.0 °C.
specific heat capacity of water = 4190 J kg⁻¹ K⁻¹

(3)

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Minimum time taken for water to be heated =

- (b) The heater was left on and water continued to boil in the flask. The water was allowed to boil for a few minutes. The conical flask was then placed under the heat exchanger and water was collected in it.

(i) Give a reason why the water was left boiling for a few minutes before the conical flask was put in place.

(1)

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- (ii) Water with a mass of 95.0 g was collected in a time of 125 s.
Calculate the rate of energy transfer in the heat exchanger.
specific latent heat of vaporisation of water = 2.26×10^6 J kg⁻¹

(3)

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Rate of energy transfer in the heat exchanger =

- (iii) Discuss your answers to (a)(i) and (b)(ii).

(3)

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(Total for question = 12 marks)