Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/02 Depth in physics (Foundation Tier)

Question Set 9

1 Sarah carries out an experiment to measure the specific latent heat of vaporisation of water. She does this by finding the energy needed to evaporate a known mass of water.

The apparatus she uses is shown in **Fig. 1.1**.

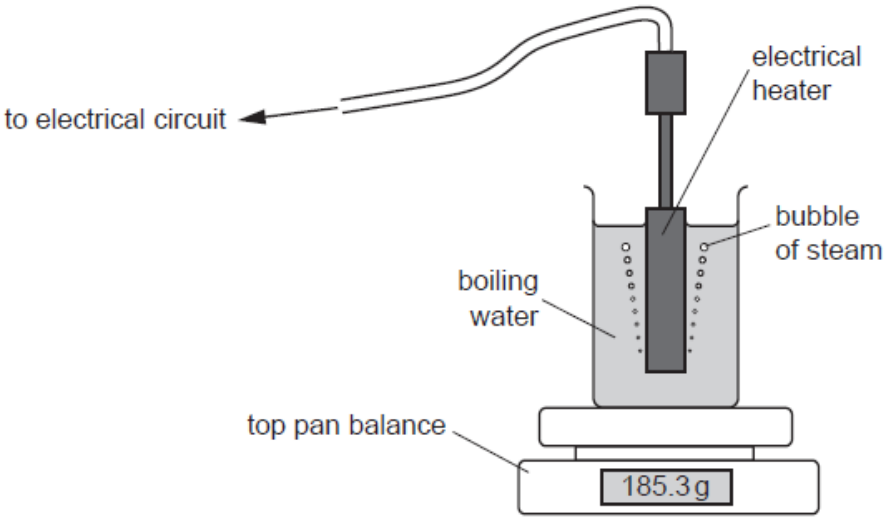


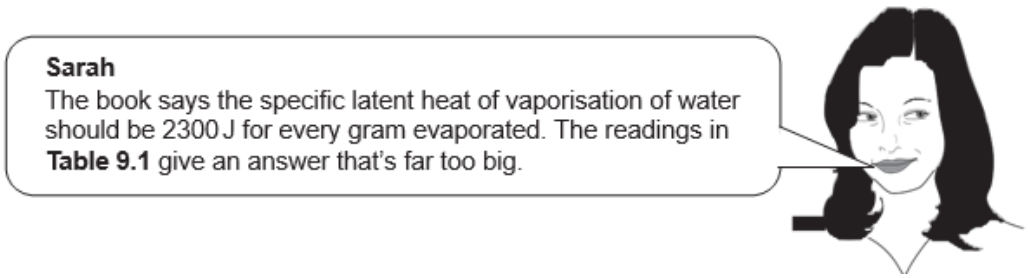
Fig. 1.1

Using this apparatus, Sarah takes these readings.

	Measured value
current	3.0 A
potential difference	12 V
time	150 s
balance reading at start	185.3 g
balance reading at the end	184.3 g

Table 1.1

(a)* Sarah is not happy with her results.



Is Sarah right?

What could Sarah do to get an accurate value of the specific latent heat of vaporisation of water from her experiment? **[6]**

(b) Sarah's book has this information about vaporisation of two liquids.

Liquid	Specific latent heat of vaporisation (J per gram)
water	2300
alcohol	950

Suggest why it takes more energy to evaporate 1 gram of water than it does to evaporate 1 gram of alcohol. **[3]**

Total Marks for Question Set 9: 9

Resource Materials

Equations in Physics

change in internal energy = mass × specific heat capacity × change in temperature

energy to cause a change in state = mass × specific latent heat

for gases: pressure × volume = constant
(for a given mass of gas and at a constant temperature)

$(\text{final speed})^2 - (\text{initial speed})^2 = 2 \times \text{acceleration} \times \text{distance}$

energy stored in a stretched spring = ½ × spring constant × $(\text{extension})^2$

potential difference across primary coil × current in primary coil =
potential difference across secondary coil × current in secondary coil

Higher tier only –

pressure due to a column of liquid = height of column × density of liquid × g

force = magnetic flux density × current × length of conductor

potential difference across primary coil ÷ potential difference across secondary coil = number of turns in primary coil ÷ number of turns in secondary coil

change in momentum = resultant force × time for which it acts