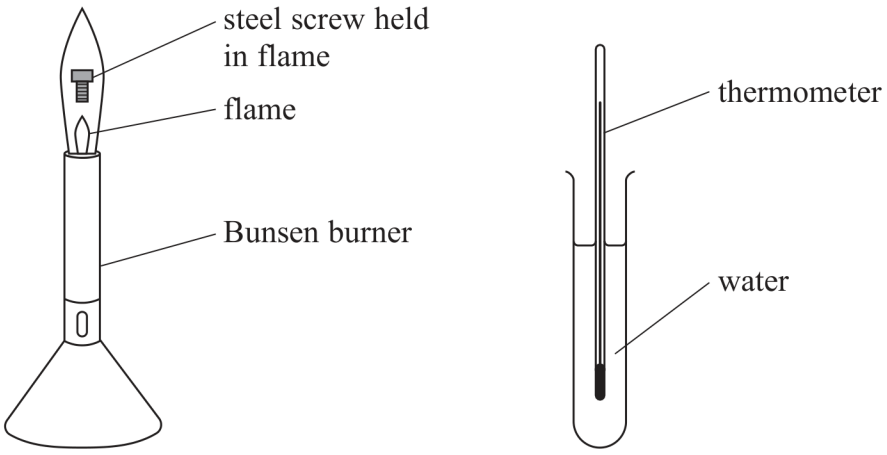
Answer ALL questions.

1 A student estimated the temperature of a Bunsen burner flame using the apparatus shown.



The student held the steel screw in the flame and then cooled it in a test tube of water.

(a) Identify one safety issue and how it may be dealt with.

(2)

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(b) The student stated:

energy dissipated by screw in cooling = energy gained by water in heating

The student measured the temperature increase for different masses of water. She recorded the following results.

Mass of water / g	Temperature increase
9.9	62
16.6	37.5
20	31

(i) Criticise the recording of the results.

(2)

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(ii) State one variable that should be controlled for this experiment.

(1)

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(iii) Show that the temperature of the Bunsen burner flame is about 1500 °C above the initial temperature of the water.

mass of screw = 4.11 g
specific heat capacity of steel = 420 J kg^{-1} K^{-1}
specific heat capacity of water = 4180 J kg^{-1} K^{-1}

(3)

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(Total for Question 1 = 8 marks)