13 (a) A diver breathes air from a cylinder when he is under water.

(i) The cylinder contains 8 litres of air at 200 times atmospheric pressure.

The air is released from the cylinder at normal atmospheric pressure.

The diver needs 16 litres of air per minute.

Calculate the maximum amount of time that the diver can breathe under water using this cylinder.

(3)

time = ... minutes

(ii) When the diver breathes out, bubbles are released.

Suggest why the bubbles expand as they rise to the surface.

(2)

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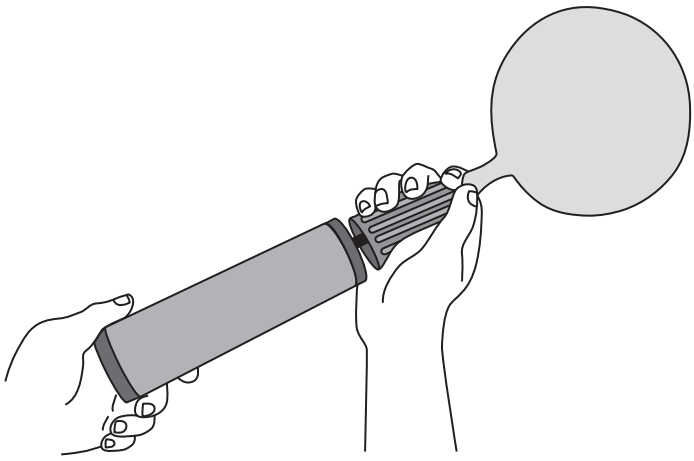
(b) A student wants to investigate how the volume of a balloon changes with pressure.



(i) Suggest how the student could measure the volume of an inflated balloon.

(2)

(ii) The student plans to measure the pressure of the air in the balloon.

> To measure the pressure in the balloon I will count how many times I push the pump. The same amount of air goes into the balloon with each push.
>
> When there is twice as much air in the balloon the pressure will be twice as high, so the pressure will be proportional to the number of times I push the pump.

Explain why the student's plan will not work.

(2)

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(Total for Question 13 = 9 marks)

TOTAL FOR PAPER = 120 MARKS

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