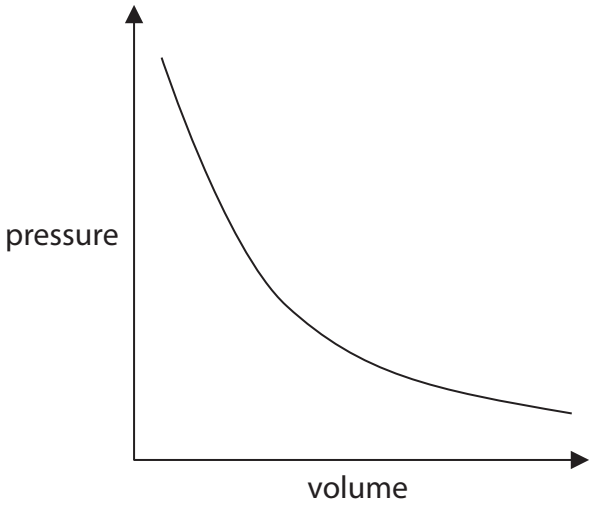
7 A glass contains fizzy water.

Bubbles of carbon dioxide form at the bottom of the glass and rise to the surface.

(a) The graph shows the relationship between the volume of a bubble and the pressure of the gas in the bubble.



(i) Describe the relationship shown by the graph.

(2)

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(ii) State the formula linking pressure difference, height, gravitational field strength and density.

(1)

(iii) The depth of the fizzy water in the glass is 22 cm.

The density of the fizzy water is 1080 kg/m^3.

Calculate the pressure difference at the bottom of the glass due to the fizzy water.

(2)

pressure difference = ... Pa

(iv) Calculate the pressure of the gas in the bubble when the bubble is at the bottom of the glass.

[atmospheric pressure = 101 000 Pa]

(1)

pressure = ... Pa

(v) When a bubble is at the top of the glass, the pressure of the gas in the bubble is equal to 101 000 Pa and the bubble has a volume of 0.084 cm^3.

Calculate the volume of the gas in the bubble when the bubble is at the bottom of the glass.

Assume the temperature of the gas remains constant.

(3)

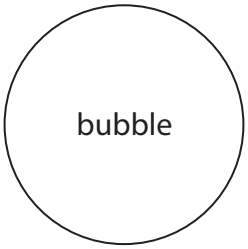
volume = ... cm^3

(b) A force called upthrust acts vertically upwards on the bubble.

When the bubble is released, it accelerates vertically upwards.

Draw two labelled arrows on the diagram to show the forces on the bubble as it is released.

(3)



(Total for Question 7 = 12 marks)

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