Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/02 Depth in physics (Foundation Tier)

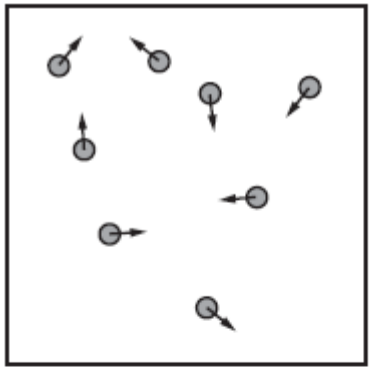
Question Set 7

1 This question is about the particles in a gas and the pressure they exert on a container.

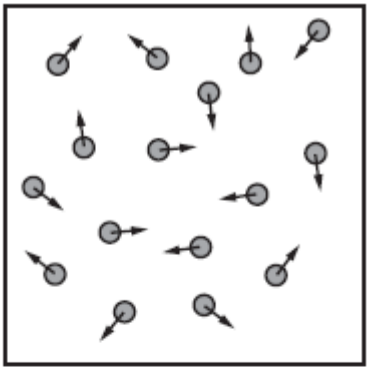
(a) The diagram below shows four samples of the same gas in containers of the same size.

Each particle is shown as a circle.

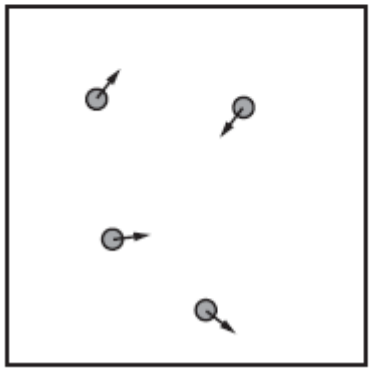
The arrow on each particle shows its velocity.



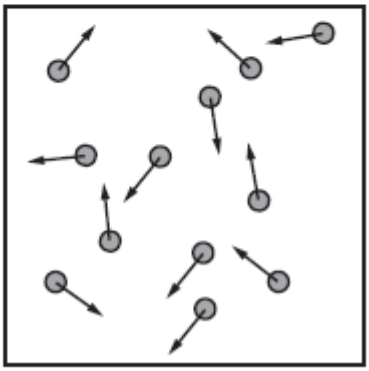
A



B



C



D

(i) Which sample has the **fastest** particles? **[1]**

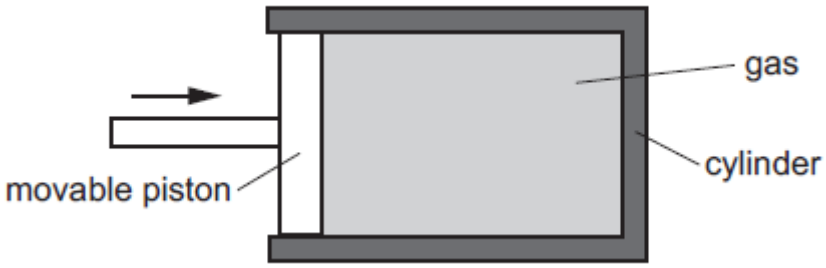
(ii) Which sample has the **greatest** density? **[1]**

(iii) Which sample is at the **highest** temperature? **[1]**

(iv) Which sample has the **smallest** pressure? **[1]**

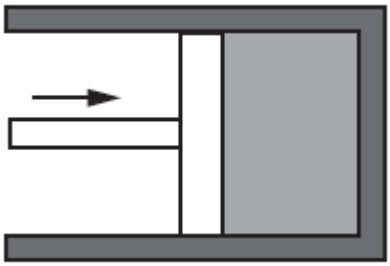
A tight-fitting moveable piston traps gas in a cylinder as shown in the diagram.

The gas has volume 300 cm^3 and pressure of 100 kilopascals (kPa).



The piston is now pushed in and changes the volume of the gas to 150 cm^3.

The temperature of the gas has not changed.



Calculate the new pressure of the gas.

Use the equation: old pressure × old volume = new pressure × new volume

New pressure = ... kPa **[2]**

(c) The piston is moved to a new position.

The force with which the gas pushes out on the piston is now 300 N.

The area of the piston is 0.002 m^2.

Calculate the pressure of the gas in pascals (Pa).

Pressure = ... Pa **[3]**

Total Marks for Question Set 7: 9