2.8 Gas Laws Past Paper Questions

1. What does the kinetic model of matter describe? **(1)**

2. Describe the kinetic model for gases. **(2)**

3. Cylinders of gas are being transported for use in factories making fizzy drinks.

Care has to be taken to ensure that the lorries carrying these cylinders are kept at a constant temperature. Explain why? **(2)**

4. Describe the changes to the pressure and volume of the air inside the air bladders of a fish, as they swim from deep water into more shallow water? **(2)**

5. What is the definition of Pressure? **(1)**

6. One *pascal* is equivalent to

A	1 N m
B	1 N m^2
C	1 N m^3
D	1 N m^{-2}
E	1 N m^{-3}

(1)

7. The surface area of a bean bag on the floor is 5.5m^2, its mass is 3kg. Calculate the pressure of the bean bag on the floor. **(3)**

8. A box has a surface area of 2m by 2m and a mass of 25kg.

(a) Calculate the surface area of the box. **(1)**
(b) Calculate the force of the box on the floor. **(3)**
(c) Hence calculate the pressure of the box on the floor. **(3)**

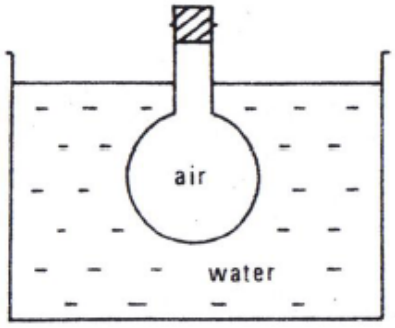
9. An aircraft cruises at an altitude at which the external pressure is 0.04×10^5 Pa. The air pressure inside the aircraft cabin is maintained at 1.0×10^5 Pa. The area of an external cabin door is $2.0\ m^2$.

What is the outward force on the door due to the pressure difference?

You must show your working

A 0.30×10^5 N
B 0.70×10^5 N
C 1.2×10^5 N
D 2.0×10^5 N
E 2.8×10^5 N **(3)**

10. A flask in a water bath at a temperature of 20°C contains air at atmospheric pressure.

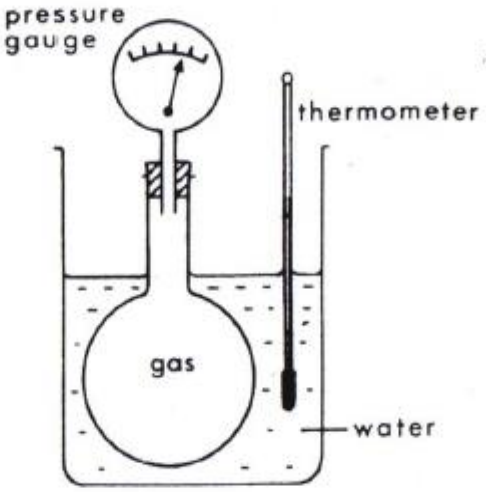


If the temperature of the water is raised to 100°C, what will be the effect on the pressure of the gas and the total kinetic energy of its molecules?

	Pressure	*Kinetic energy*
A	Increase	Unchanged
B	Increase	Increase
C	Decrease	Increase
D	Unchanged	Increase
E	Increase	Decrease

(1)

11 (*a*) A pupil investigates the relationship between the pressure and temperature of a fixed mass of gas using the apparatus shown.



He heats the water continuously using a Bunsen burner and records the pressure and temperature readings every minute.

(i) State two ways in which this experiment may be improved.

(ii) Using the results from an improved experiment, describe how the relationship between pressure and temperature on the kelvin scale may be found.

(*b*) A cylinder of oxygen at 27 °C has a gas pressure of 3×10^6 Pa.

(i) Calculate the pressure of the gas if the cylinder is cooled to 0 °C.

(ii) Describe what happens to the gas molecules as the gas is cooled and indicate how this results in a reduction of pressure. 5

(*c*) When air in a bicycle pump is compressed by moving the piston, the temperature of the air in the pump increases. Explain this temperature rise in terms of the kinetic theory of gases. 2

Total Marks Available = 30