

States of Matter – 2016

1. 9701/11/O/N/16/2

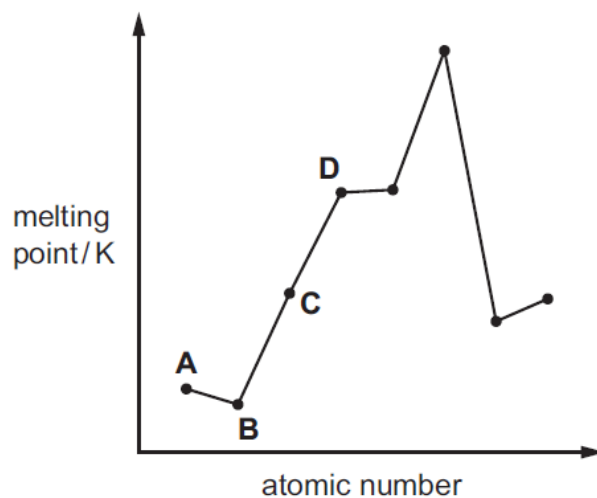
In the ideal gas equation, $pV = nRT$, what are the units of n and T ?

	n	T
A	no units	°C
B	no units	K
C	mol	°C
D	mol	K

2. 9701/11/O/N/16/13

The diagram shows the melting points of eight elements with consecutive atomic numbers.

Which element could be sodium?



3. 9701/12/O/N/16/8

In an experiment, a sample of a pure gas is put into a gas syringe at a temperature of 300K and pressure of 16 kPa. The gas is compressed until the volume occupied by the gas is halved.

After compression, the temperature of the gas in the syringe is 375K and the pressure is 40 kPa.

Which statement is correct?

- A Intermolecular forces between the gas molecules are significant.
- B It is possible to calculate the number of moles of gas present using these data alone.
- C The gas is behaving ideally.
- D The pressures used are too high for ideal gas behaviour.

4. 9701/12/F/M/16/7

What is the volume of steam produced when 1.00g of ice is heated to 323 °C at a pressure of 101 kPa?

- A 0.27 dm³ B 1.3 dm³ C 2.7 dm³ D 48 dm³

5. 9701/12/F/M/16/8

Solid carbon dioxide, CO_2 , is similar to solid iodine, I_2 , in its structure and properties. Carbon is in Group 14. Silica, SiO_2 , is a Group 14 compound.

Which statement about solid CO_2 and solid SiO_2 is correct?

- A Both solids exist in a lattice structure.
- B Both solids have a simple molecular structure.
- C Both solids have atoms joined by single covalent bonds.
- D Both solids change spontaneously to gas at s.t.p.

6. 9701/12/F/M/16/9

An article in a science magazine contains the following statement.

'It is lighter than a feather, stronger than steel, yet incredibly flexible and more conductive than copper.'

Which form of carbon is being described?

- A buckminsterfullerene
- B diamond
- C graphene
- D graphite

7. 9701/11/M/J/16/32

What are basic assumptions of the kinetic theory as applied to an ideal gas?

- 1 Gas particles are in continuous random motion.
- 2 Gas particles experience no intermolecular forces.
- 3 The volume of each gas particle is zero.

8. 9701/12/M/J/16/6

Argon is a gas used to fill electric light bulbs.

Under which conditions of pressure and temperature will argon behave most like an ideal gas?

	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

9. 9701/12/M/J/16/7

0.10 g of the volatile liquid X formed 0.025 dm³ of vapour at 100 °C and atmospheric pressure.

1 mol of vapour occupies 22.4 dm³ at 0 °C and atmospheric pressure.

What is the relative molecular mass of X?

A $\frac{0.025 \times 273 \times 22.4}{0.10 \times 373}$

B $\frac{0.025 \times 373 \times 22.4}{0.10 \times 273}$

C $\frac{0.10 \times 273 \times 22.4}{0.025 \times 373}$

D $\frac{0.10 \times 373 \times 22.4}{0.025 \times 273}$

10. 9701/13/M/J/16/2

What will make it more likely that a gas will approach ideal behaviour?

- A** higher pressure
- B** lower temperature
- C** more polar molecules
- D** weaker intermolecular forces