1. 1.7 g of $NaNO_3$ (M_r = 85) is dissolved in water to prepare 0.20 dm^3 of solution. What is the concentration of the resulting solution in mol dm^{-3}?

A. 0.01

B. 0.1

C. 0.2

D. 1.0

2. A fixed mass of gas has a certain volume at a temperature of 50 °C. What temperature is required to double its volume while keeping the pressure constant?

A. 100 K

B. 323 K

C. 373 K

D. 646 K

3. What is the concentration of NaCl, in mol dm^{-3}, when 10.0 cm^3 of 0.200 mol dm^{-3} NaCl solution is added to 30.0 cm^3 of 0.600 mol dm^{-3} NaCl solution?

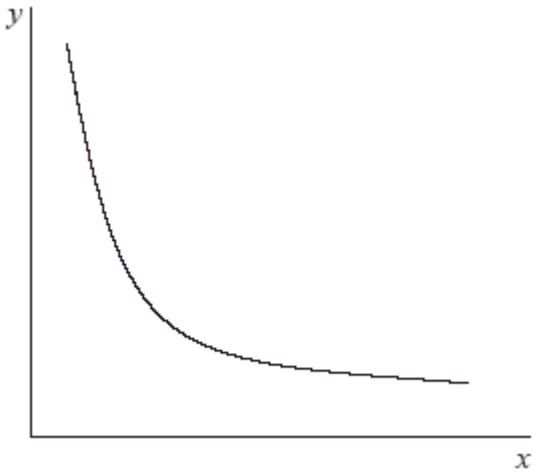
A. 0.450

B. 0.300

C. 0.500

D. 0.800

4. The graph below represents the relationship between two variables in a fixed amount of gas.



Which variables could be represented by each axis?

	***x*-axis**	***y*-axis**
A.	pressure	temperature
B.	volume	temperature
C.	pressure	volume
D.	temperature	volume

5. 8.5 g of NH_3 are dissolved in H_2O to prepare a 500 cm^3 solution. Which statements are correct?

I. NH_3 is the solute and H_2O is the solution

II. The concentration of the solution is 17 g dm^{-3}

III. $[NH_3] = 1.0$ mol dm^{-3}

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

6. 300 cm^3 of water is added to a solution of 200 cm^3 of 0.5 mol dm^{-3} sodium chloride. What is the concentration of sodium chloride in the new solution?

A. 0.05 mol dm^{-3}

B. 0.1 mol dm^{-3}

C. 0.2 mol dm^{-3}

D. 0.3 mol dm^{-3}

7. 5 dm^3 of carbon monoxide, CO(g), and 2 dm^3 of oxygen, $O_2(g)$, at the same temperature and pressure are mixed together. Assuming complete reaction according to the equation given, what is the maximum volume of carbon dioxide, $CO_2(g)$, in dm^3, that can be formed?

$$2CO(g) + O_2(g) \rightarrow 2CO_2$$

A. 3

B. 4

C. 5

D. 7

8. What volume of sulfur trioxide, in cm^3, can be prepared using 40 cm^3 sulfur dioxide and 20 cm^3 oxygen gas by the following reaction? Assume all volumes are measured at the same temperature and pressure.

$$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$$

A. 20

B. 40

C. 60

D. 80

(Total 1 mark)

9. The volume of an ideal gas at 27.0 °C is increased from 3.00 dm^3 to 6.00 dm^3. At what temperature, in °C, will the gas have the original pressure?

A. 13.5

B. 54.0

C. 327

D. 600

10. What volume of carbon dioxide, in dm^3 under standard conditions, is formed when 7.00 g of ethene (C_2H_4, M_r = 28.1) undergoes complete combustion?

A. $\frac{22.4 \times 28.1}{7.00}$

B. $\frac{22.4 \times 7.00}{28.1}$

C. $\frac{2 \times 22.4 \times 28.1}{7.00}$

D. $\frac{2 \times 22.4 \times 7.00}{28.1}$

11. A toxic gas, A, consists of 53.8 % nitrogen and 46.2 % carbon by mass. At 273 K and 1.01×10^5 Pa, 1.048 g of A occupies 462 cm^3. Determine the empirical formula of A. Calculate the molar mass of the compound and determine its molecular structure.