

Name _____

Date _____

End of Chapter 4 test

This test and its sample answers have been written by the authors. IB may award marks differently.

Avogadro constant $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$

- 1 How many moles of ascorbic acid ($\text{C}_6\text{H}_8\text{O}_6$) contain 1.2×10^{23} hydrogen atoms?
 - A 0.250
 - B 0.025
 - C 0.200
 - D 0.020

- 2 If you spend 20 Hong Kong dollars (HKD) on a 500 ml bottle of water, how much does each water molecule cost you?
 - A 1.2×10^{-24} HKD
 - B 6.2×10^{-26} HKD
 - C 0.72 HKD
 - D 6.2×10^{-23} HKD

- 3 The mass in kg for one molecule of oxalic acid ($\text{C}_2\text{H}_2\text{O}_4$) is
 - A 90
 - B 46
 - C 1.5×10^{-25}
 - D 1.5×10^{-19}

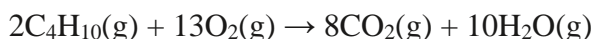
- 4 Which sample has the greatest number of nitrogen atoms?
 - A 0.15 mol of N_2H_4
 - B 0.25 mol of HNO_3
 - C 0.20 mol of $\text{C}_6\text{H}_5\text{NH}_2$
 - D 18.4 g of N_2O_4

- 5 Which of the following samples has the least mass?
 - A 5 mol of H_2O
 - B 2 mol of CH_3COCH_3
 - C 1 mol of FeCl_2
 - D 2 mol of NaOH

- 6 Which of the following is not an empirical formula?
- A NH
 - B CH₂O
 - C H₂O₂
 - D Na₃PO₄
- 7 32 g of an element X combines with oxygen to form the compound XO₃. If 48 g of O₂ gas were used, what is the molar mass of X?
- A 32
 - B 32 g/mol
 - C 64
 - D 64 g/mol
- 8 A compound Y contains the following molecular composition: carbon 60.0%, hydrogen 4.4%, oxygen 35.6%. What could be the molecular formula for Y?
- A C₁₀H₈O₂
 - B C₇H₁₄O₂
 - C C₉H₈O₄
 - D C₆H₁₂O₆
- 9 Heating 24.8 g of hydrated sodium thiosulfate crystals (Na₂S₂O₃·xH₂O) to constant mass leaves 15.8 g of anhydrous sodium thiosulfate. What is the value of x?
- A 3
 - B 4
 - C 5
 - D 8
- 10 0.1 mol of a hydrocarbon burns completely in oxygen to produce 13.2 g of carbon dioxide and 5.4 g of water. What is the molecular formula for the hydrocarbon?
- A CH₂
 - B C₂H₄
 - C C₃H₆
 - D C₄H₈

- 11** How much water do you need to add to dilute 500 cm^3 of a 0.20 mol/dm^3 saline solution to 0.0800 mol/dm^3 ?
- A** 250 cm^3
B 500 cm^3
C 750 cm^3
D 1250 cm^3
- 12** 80 cm^3 of water is added to 120 cm^3 of a solution of $0.10\text{ mol/dm}^3\text{ AgNO}_3$. What is the new concentration of the diluted solution?
- A** 0.04 mol/dm^3
B 0.06 mol/dm^3
C 0.08 mol/dm^3
D 0.15 mol/dm^3
- 13** What is the concentration of ammonium ions when 9.6 g of $(\text{NH}_4)_2\text{CO}_3$ dissolve in water to form 100 cm^3 of aqueous solution?
- A** 1 mol/dm^3
B 2 mol/dm^3
C 0.001 mol/dm^3
D 0.002 mol/dm^3

Questions 14 and 15 are based on the complete combustion of butane:



- 14** If 50 cm^3 of butane burn in excess oxygen, how much carbon dioxide is formed at the same temperature and pressure?
- A** 50 cm^3
B 200 cm^3
C 250 cm^3
D 400 cm^3
- 15** If 100 cm^3 of butane burn in 700 cm^3 of oxygen, how much carbon dioxide is formed at the same temperature and pressure?
- A** 400 cm^3
B 431 cm^3
C 700 cm^3
D 800 cm^3

END OF TEST