

Chemistry A level transition - baseline assessment.

40 marks

All data is given on this paper, you will not need a periodic table

Answer all questions.

1. Here is part of a periodic table, use it to answer the following questions

10.8	12.0	14.0	16.0	19.0	20.2
5	6	7	8	9	10 Ne
boron	carbon	nitrogen	oxygen	fluorine	
27.0	28.1	31.0	32.1	35.5	39.9
13	14	15	16	17	18
Al	Silicon	phosphorus	sulphur	chlorine	argon

a. Which is the correct electron configuration for a nitrogen atom, circle the correct answer [1]

		1s²2p ⁵	1s ¹ 2p ⁶	1s ² 2s ² 2p ³	1s ² 2s ⁵	1s ² 2s ² 2p ⁶ 3s ² 3p ²	
	b.	Which is the cor	rect electron conf	iguration for a chl	orine atom, circle	the correct answe	r [1]
		1s ² 2s ⁸ 2p ⁷	1s ² 2s ² 2p ⁸ 2d ⁵	1s ² 2s ² 2p ⁶ 3d ⁷	1s ² 2s ² 2p ⁶ 3p ⁷	1s ² 2s ² 2p ⁶ 3s ² 3p ⁵	
	С.	Which is the correct electron configuration for an aluminium ion , Al ³⁺ ? Circle the correct answer					t [1]
		1s ² 2s ² 2p ⁶	1s ² 2s ² 2p ⁶ 3s ² 3p ³	1s ² 2s ² 2	p ⁶ 3s ²	1s ² 2s ² 2p ⁶ 2d ¹	
2.	Draw a d	dot and cross dia	gram to show the	bonding in a mole	ecule of water, H_2	D.	[2]

Atomic numbers: H =1, O =8

3. A time of flight mass spectrometer has 4 main stages. put the correct stage in the diagram below:



[4]



4. A mass spectrometer was used to analyse a sample of chlorine; the results of the analysis are as follows:

isotope mass	% of sample
Cl-35	75.53
Cl-37	24.47

	Calculate the accurate atomic mass of chlorine. Give your answer to 3 decimal places .				
			mass: _		
5.	5. Give the oxidation state of the underlined atom in the following chemicals. Useful information: H = +1, K = +1, Na = +1, Mg = +2, O = -2, Cl = -1				[7]
	a) <u>C</u> O2	b) <u>S</u> O₃	c) H2 <u>S</u> O4	d) <u>AI</u> Cl₃	
	e) <u>Cr</u> 2O3	f) Na <u>N</u> O₃	g) <u>V</u> Cl ₄		
6.	Balance the follo	owing chemical ec	quations:		
	a) $C_3H_8 + \O_2 \rightarrow \CO_2 + \H_2O$				
	b) HCl + Mg(OH) ₂ \rightarrow MgCl ₂ + H ₂ O				
	c) Na ₂ CO ₃ + HCl \rightarrow NaCl + H ₂ O + CO ₂				[3]
7.	Calculate the rel Atomic masses:	ative formula ma H = 1, O = 16, S =	sses of the followi 32.1, C = 12, Ca =	ng: 40.1, Na = 23, Cl = 35.5, Zn = 65.4	

a) CaCl ₂	b) H ₂ CO ₃	c) Na ₂ SO ₄	d) C₃H₂OH	e) Zn(NO ₃) ₂	[5]
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8. A student carried out a reaction with this molecule:





9. Vinegar is a solution of ethanoic acid (CH₃COOH) in water. A student carried out a titration of a sample of vinegar.
He used a pipette to measure exactly 25.0cm³ of vinegar into a flask, added an indicator and titrated it

with a 1.00 mol dm⁻³ solution of sodium hydroxide (NaOH). The reaction is:

 $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

The student found that his average titration was 27.50cm³

- c = n/v c = concentration (mol dm⁻³), n = number of moles, v = volume (dm³)
- n = m/Rfm n = number of moles, m = mass in grams, Rfm = formula mass

1dm³ = 1000 cm³

- a. Using the chemical equation, how many moles of sodium hydroxide will react with 1 mole of ethanoic acid?
 - _____moles [1]
- b. How many moles of sodium hydroxide are in 27.50cm³ of 1.00 moldm⁻³ sodium hydroxide?

_____moles [2]

c. How many moles of ethanoic acid are in 25.0cm³ of the vinegar sample?

_____moles [1]

d. How many moles of ethanoic acid are in 1dm³ of vinegar?

_____moles [1]

e. Ethanoic acid has a formula mass of 48. What mass of ethanoic acid is present in 1dm³ of vinegar?

_____g [2]