Transition Pack for A Level Chemistry

Get ready for A-level!
A guide to help you get ready for A-level Chemistry, including everything from topic guides to days out and online learning courses.

Commissioned by The PiXL Club Ltd. February 2016

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Please note: these resources are non-board specific. Please direct your students to the specifics of where this knowledge and skills most apply.

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 $_5$B boron	12.0 $_6$C carbon	14.0 $_7$N nitrogen	16.0 $_8$O oxygen	19.0 $_9$F fluorine	20.2 $_{10}$Ne neon
27.0 $_{13}$Al aluminium	28.1 $_{14}$Si silicon	31.0 $_{15}$P phosphorus	32.1 $_{16}$S sulphur	35.5 $_{17}$Cl chlorine	39.9 $_{18}$Ar argon

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

   [1]

   $1s^2 2p^5$ $1s^1 2p^6$ $1s^2 2s^2 2p^3$ $1s^2 2s^5$ $1s^2 2s^2 2p^6 3s^2 3p^2$

   b. Which is the correct electron configuration for a chlorine atom, circle the correct answer

   [1]

   $1s^2 2s^8 2p^7$ $1s^2 2s^2 2p^8 2d^5$ $1s^2 2s^2 2p^6 3d^7$ $1s^2 2s^2 2p^6 3p^7$ $1s^2 2s^2 2p^6 3s^2 3p^5$

   c. Which is the correct electron configuration for an aluminium **ion**, Al^{3+}? Circle the correct answer   [1]

   $1s^2 2s^2 2p^6$ $1s^2 2s^2 2p^6 3s^2 3p^3$ $1s^2 2s^2 2p^6 3s^2$ $1s^2 2s^2 2p^6 2d^1$

2. Draw a dot and cross diagram to show the bonding in a molecule of water, H_2O.   [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:

      Drift region   **Ionisation**   **Detector**   **Acceleration**

[4]

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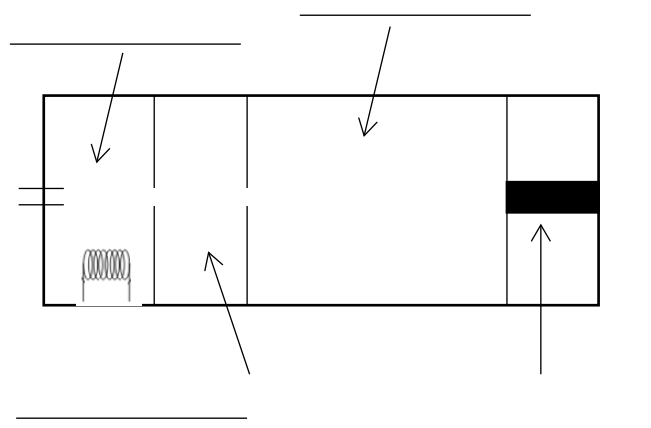
4. A mass spectrometer was used to analyse a sample of chlorine; the results of the analysis are as follows:

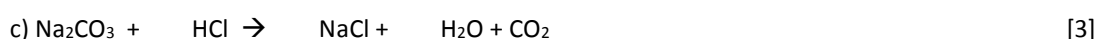| isotope mass	% of sample
Cl-35	75.53
Cl-37	24.47

Calculate the accurate atomic mass of chlorine. Give your answer to **3 decimal places**.   [3]

mass: _____

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) $\underline{C}O_2$ b) $\underline{S}O_3$ c) $H_2\underline{S}O_4$ d) $\underline{Al}Cl_3$

   e) $\underline{Cr}_2O_3$ f) $Na\underline{N}O_3$ g) $\underline{V}Cl_4$

6. Balance the following chemical equations:

   a) $C_3H_8 +$ ___ $O_2 \rightarrow$ ___ $CO_2 +$ ___ H_2O [3]

   b) ___ $HCl + Mg(OH)_2 \rightarrow MgCl_2 +$ ___ H_2O [2]

   c) $Na_2CO_3 +$ ___ $HCl \rightarrow$ ___ $NaCl +$ ___ $H_2O + CO_2$ [3]

7. Calculate the relative formula masses of the following:
   Atomic masses: H = 1, O = 16, S = 32.1, C = 12, Ca = 40.1, Na = 23, Cl = 35.5, Zn = 65.4

   a) $CaCl_2$ b) H_2CO_3 c) Na_2SO_4 d) C_3H_7OH e) $Zn(NO_3)_2$ [5]

8. A student carried out a reaction with this molecule:
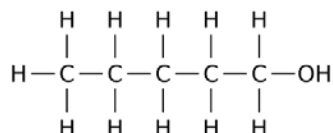
   a. What is the name of this molecule? _____ [2]

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9. Vinegar is a solution of ethanoic acid (CH_3COOH) in water. A student carried out a titration of a sample of vinegar.
He used a pipette to measure exactly 25.0cm^3 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:

$$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$$
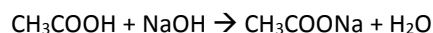
The student found that his average titration was 27.50cm^3

$c = n/v$ c = concentration (mol dm^{-3}), n = number of moles, v = volume (dm^3)

$n = m/Rfm$ n = number of moles, m = mass in grams, Rfm = formula mass

$1dm^3 = 1000 cm^3$

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 27.50cm^3 of 1.00 moldm^{-3} sodium hydroxide?

_____moles   [2]

c. How many moles of ethanoic acid are in 25.0cm^3 of the vinegar sample?

_____moles   [1]

d. How many moles of ethanoic acid are in 1dm^3 of vinegar?

_____moles   [1]

e. Ethanoic acid has a formula mass of 48. What mass of ethanoic acid is present in 1dm^3 of vinegar?

_____g   [2]