Test review – Unit 8

Skill Review

Section	Skill	R	A	G
1	Your class	Got in wrong	Didn't know	Got it right !
2	Chromatography	0-1	2-3	4-5
3	Testing for gases	0-2	3-4	5-6
4	Testing for positive ions	0-4	5-10	11-15
5	Testing for negative ions	0-2	3-4	5-7
6	Instrumental methods	0-1	2-3	4-5

I can...

Name 6 of my class & my teacher after a three-year course.
Adequately describe chromatography & flame emission spectroscopy.
Group & recall the full method for the flame test.

I need to...

Concentrate more — ie, re-read question & answer: eg, ionic equation, word equation not result.
Eg, go over diatomics & why halogens are gases at room temperature.

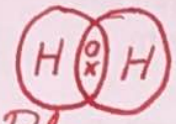
Questions	Mark	Upgrade questions
1 - Your class	2	a) Find out what class you are in 11TD2 b) Find out who your teacher is Mr Maiden
2 - Chromatography	4	a) Draw a paper chromatography set up and label it correctly b) Define the word solvent, solute and saturated c) Write an equation to calculate the Rf value d) What does paper chromatography allow you to identify
3 – Testing for gases	4	a) Describe the test for hydrogen gas b) Why is hydrogen a gas at room temperature c) Draw a dot and cross diagram to0 represent hydrogen gas d) Describe the test for oxygen gas
4 – Testing for positive ions	10	a) What does the flame test allow you to identify? b) Why do different metal ions give off different colours? c) Explain how you would identify the positive ion in an ionic sample d) Write an ionic half equation for the creation of copper ions from copper
5 – Testing for negative ions	5	a) Describe how to test for a carbonate ion b) What will be seen if nitric acid is mixed with silver nitrate and sodium chloride c) Describe how you would test for sulfate ions
6 – Instrumental methods	4	d) Give one example of an instrumental method e) Why do scientists use instrumental methods? f) What is a disadvantage of using instrumental methods

3) (a) Place a lit splint into the vessel containing sample - will produce an audible 'squeaky pop' if H_2 is present

(b) The KE at room temperature is far greater than the intermolecular bond energy that would otherwise contribute to the cohesive property of H_2 molecules.

(I keep getting 2/3 on these questions, what more do I need to say to get full marks.)

(c)



(d) Place an extinguished splint into the vessel containing the sample - if O_2 is present, the splint will either relight or glow.

4) (a) Flame test allows identification of metal ions in compounds

(b) As when the electrons become excited (due to heating), they move between the ground state & higher energy levels — the pathway back down is clearly defined due to quantum probabilities — thus the energy emitted as a photon is very specific — esp, so is the wavelength of light.

(c) By conducting the flame test & following up with NaOH test if Ca^{2+} or Al^{3+}

(d) $Cu \rightarrow Cu^{2+} + 2e^-$

5) (a) Add a few drops of a dilute acid & connect the test tube into some $Ca(OH)_2$ - reaction produces CO_2 & turns $Ca(OH)_2$ cloudy.

(b) A white precipitate of AgCl will form.

(c) Add dilute HCl, then $BaCl_2$ - if sulphate ions present, a white precipitate forms.

6) (a) Flame emission spectroscopy

(b) As they are more accurate & faster

(c) Machines are very expensive

1) A greenhouse gas is a gas which absorbs & emits radiation within the thermal IR range (3-8 μm, 37-100 THz).
The primary greenhouse gases are:
H_2O (g)
CO_2
CH_4
N_2O
O_3

2) CATALYSIS — increasing rate of chemical reaction through catalysts

∴ A catalytic converter uses catalysts to speed up redox reactions of:
- Reduction of nitrous oxides to N_2
- Oxidation of carbons, hydrocarbons & carbon monoxide to CO_2

Catalytic converters require temperatures of 426°C for effective operation & are therefore placed as close to the engine as possible.

Despite the catalytic converter reducing toxic gases & pollutants from the engine block, it still emits CO_2, one of the primary greenhouse gases. Because of the operating temperature required, most of the pollution emitted by the catalytic converter are emitted within the first few minutes.

Catalytic converters can also form H_2S & NH_3 & these emissions are very difficult to eliminate completely.

3) GEOTHERMAL - use of the thermal energy in the Earth's crust.

SOLAR - use of radiant light & heat from the Sun.

TIDAL - use of the E_K from the natural rise & fall of ocean tides & currents.

4) The greenhouse gases in the atmosphere store the thermal radiation hitting it - either through direct sunlight, or through reflected light energy on the surface of the Earth. The greenhouse gases then emit this energy in all directions - some of it radiating downwards, heating the troposphere. Whilst, initially, the greenhouse effect was a precursor to life, as a result of the actions of man, it is heating up to excess - ecosystems are being destroyed.

5) CO_2: $O=C=O$ or $\delta O = C \delta+$ i.e. O has a greater electronegativity & is therefore polar covalent.

This results in the oxygen pulling the electrons towards themselves with equal force. This results in very little intermolecular force, which is easily overcome at the energy levels found at room temperature.

6) Early volcanic activity spewed N_2, CO_2, H_2, CH_4, H_2S & H_2O into the atmosphere - but very little oxygen. This meant very little life as is known today could be sustained on Earth. The atmosphere contained anywhere from ~200 times the amount of CO_2 as today - ~4 billion years ago.

8) CO_2 is highly soluble. As the molten Earth's crust hardened, the water vapour could settle upon it. As the oceans formed, CO_2 began dissolving into them. Then began the carbon cycle — whereby CO_2 would become trapped in organic matter & fossilised or stored in limestone. Organisms respire using CO_2 — plants absorb it & fossilise — thus the continued presence of CO_2 in the atmosphere.