Chemistry facts to learn for GCSE Combined Science. Remember paper 1 will have questions on topics 1,2,3,4 and paper 2 will have questions on topics 1,6,7,8.

Get someone to ask you these questions until you get all the answers right. Questions in bold are for the Higher Paper only.

Topic 1 (can be tested on Paper 1 and Paper 2)

Topic 1 Questions	Q	Topic 1 answers
What are the 4 state symbols?	1	Solid (s), liquid (l), gas (g) and aqueous (aq)
What are the 3 sub-atomic particles		Protons and neutrons which are found in the
and where are they found?	2	nucleus and electrons which are in shells
		around the nucleus
What are the masses and charges of	0	Proton – mass of 1, charge of +1
the 3 sub-atomic particles?	3	Electron – mass of 1/2000, charge of -1
		They contain equal numbers of protons
Why do atoms have no overall	4	which are positively charged and electrons
charge?		which are negatively charged and clochens
		Different forms of the same element which
What are isotopes?	5	have the same number of protons but a
		different number of neutrons
Why do some atoms not have whole	6	The average of all the isotopes may not be
numbers as mass numbers?	0	a whole number
How do you calculate the relative	7	Find the sum of the isotope masses and then
atomic mass of an element?		divide by 100
How ald Mendeleev arrange the	8	In increasing atomic weights and by similar
What is a row in the periodic table		
called?	9	A period
What is a column in the periodic table	10	
called?	10	A group
How are jonic bonds formed?	11	Electrons are transferred from a metal to a
		non-metal
What is a cation?	12	A positive ion made when an atom loses
		electrons
How does a CU atom turn into a CU^{2+}	13	It loses 2 electrons
10116		A pagative ion made when an atom gains
What is an anion?	14	electrons
What does –ate mean in a		A compound containing oxygen as well as
compound?	15	another element
How does a sulphide differ from	17	A sulphide contains sulphur in a compound,
sulphate?	10	a sulphate contains sulphur and oxygen
What is the structure of an ionic		A giant lattice with regularly arranged
compound?	17	positive and negative ions held together by
		strong electrostatic forces of attraction
De jenie e empresar de estada estad		No when solid as ions tixed in lattice and
Do ionic compounds conduct	18	curinoi move; yes when molten or in
electricity?		charge
		A shared pair of electrons between two
How is a covalent bond formed?	19	atom:
	Topic 1 QuestionsWhat are the 4 state symbols?What are the 3 sub-atomic particles and where are they found?What are the masses and charges of the 3 sub-atomic particles?Why do atoms have no overall charge?What are isotopes?Why do some atoms not have whole numbers as mass numbers?How do you calculate the relative atomic mass of an element?How did Mendeleev arrange the elements in the periodic table?What is a row in the periodic table called?What is a column in the periodic table called?What is a cation?How does a Cu atom turn into a Cu2+ ion?What is an anion?What is the structure of an ionic compound?Do ionic compounds conduct electricity?How is a covalent bond formed?	Topic 1 QuestionsQWhat are the 4 state symbols?1What are the 3 sub-atomic particles and where are they found?2What are the masses and charges of the 3 sub-atomic particles?3Why do atoms have no overall charge?4What are isotopes?5Why do some atoms not have whole numbers as mass numbers?6How do you calculate the relative atomic mass of an element?7How did Mendeleev arrange the elements in the periodic table?8What is a column in the periodic table called?10How does a Cu atom turn into a Cu2+ ion?13What is an anion?14What is the structure of an ionic compound?17Do ionic compounds conduct electricity?18How is a covalent bond formed?19

20	Put these in order of size from biggest to smallest: molecule, atom, proton, polymer	20	Proton, atom, molecule, polymer
21	What are the properties and structure of diamond?	21	Giant tetrahedral structure with 4 strong covalent bonds between the carbon atoms. High melting points, hard, non- conductor of electricity with no charge carriers
22	What are the properties and structure of graphite?	22	Layers of carbon atoms with 3 strong covalent bonds between each carbon atom. High melting point, but slippery as weak intermolecular forces between layers. Delocalised electrons can carry charge, so a good conductor of electricity
23	What is a polymer?	23	Large molecules containing chains of carbon atoms, made from monomers
24	What are the properties and structure of C_{60} ?	24	Simple molecule, each carbon atom forms 3 bonds. Strong covalent bonds between atoms, but weak intermolecular forces between molecules mean low melting points and soft and slippery
25	What are the properties and structure of graphene?	24	A single sheet of no fixed size, each carbon makes 3 bonds. One atom thick, so very light, but very strong bonds; delocalised electrons move over surface so a good conductor of electricity
26	What are the properties and structure of metals?	25	Giant lattice of positive metal ions surrounded by a sea of delocalised electrons. Strong forces of attraction mean high melting points, free moving electrons mean good conductor of electricity
27	How do you calculate the relative formula mass of a substance?	26	Add together the mass numbers of the individual atoms
28	What is the empirical formula?	27	The simplest whole number ratio of atoms in a compound
29	How do you calculate the empirical formula?	28	MRSA: 1. (<u>M</u> ole) Divide each mass by the atomic mass; 2. (<u>R</u> atio) Divide by the smallest number; 3. (<u>S</u> implify) the numbers to give whole numbers; 4. Write the (<u>a</u> ctual) formula
30	How do you calculate the molecular formula?	29	Use the empirical formula to work out the empirical mass. Use the relative formula mass to work out how many lots of empirical formula are needed
31	What is the law of conservation of mass?	30	When two substances of known mass are reacted together, the mass of the products will be the same as the reactants
32	How do you calculate the concentration of a solution in g dm-3?	31	1. Convert volume to dm ³ (÷1000 if cm ³) 2. Concentration = <u>Mass (in g)</u> Volume (in dm ³)
33	What is one mole of a substance?	32	One mole of a substance contains the Avogadro constant (6.20 x 10 ²³)number of particles

34	How do you calculate the number of moles in a substance from its mass?	33	Number of moles = <u>Mass</u> Atomic or Formula mass
35	How do you calculate the number of particles in a substance from its number of moles?	34	Number of particles = number x Avogadro of moles constant
36	What is the limiting reactant in an experiment?	35	The limiting reagent is the substance that determines the amount of product in a reaction. (The other reagent is in excess)

Topic 2 (can be tested on Paper 1) – States of matter and separating mixtures

Q	Topic 2 Questions	Q	Topic 2 Answers
1	How are the particles arranged in a solid?	1	In a regular pattern, all touching
2	How are the particles arranged in a liauid?	2	Random arrangement, some touching
3	How are the particles arranged in a gas?	3	Random arrangement, spread far apart
4	What is the name given to the state change from a solid to a liquid?	4	Melting
5	What is the name given to the state change from a liquid to a gas?	5	Evaporation
6	What is the name given to the state change from a gas to a liquid?	6	Condensation
7	What is the name given to the state change from a liquid to a solid?	7	Freezing
8	The changes of state are classed as	8	Physical changes (not chemical changes)
9	How do the particles in a solid move?	9	Vibration about a fixed point
10	How do the particles in a liquid move?	10	They move past each other, allowing the liquid to flow
11	How do the particles in a gas move?	11	They move quickly past each other
12	What is the boiling point of a substance?	12	Temperature at which a liquid turns to a gas
13	What is a pure substance?	13	A substance that contains only one type of compound/molecule/particle
14	Pure substances have a melting point	14	specific
15	Impure substances melt over a of temperatures	15	range
16	In filtration, what is the residue?	16	The insoluble solid left in the filter paper
17	In filtration, what is the filtrate?	17	The liquid/solution that has passed through the filter paper
18	Simple distillation separates substances bas on their what?	18	Boiling point
19	In distillation, what is the distillate?	19	The liquid that has condensed and been collected in the beaker
20	What two state changes are involved in distillation?	20	Evaporation and condensation
21	Where does the cold running water enter the Liebig Condenser?	21	At the bottom
22	Which core practical involves crystallisation?	22	Preparing crystals of copper sulphate

23	In paper chromatography, why is the start line drawn in pencil?	23	Pencils is insoluble so won't interfere with results
24	Substances are separated based on what in paper chromatography?	24	Their relative solubilities
25	In chromatography, what is the stationary phase?	25	The chromatography paper
26	In chromatography, what is the mobile phase?	26	The solvent
27	In chromatography, what is the solvent front?	27	The distance that the solvent has travelled
28	How do you calculate an Rf value?	28	Distance travelled by the component / distance travelled by the solvent
29	If there is a dot left on the line after paper chromatography, what does this mean?	29	It is an insoluble component (in the current solvent)
30	What does potable mean?	30	Safe to drink
31	What are the three processes involved in making waste and ground water potable?	31	Sedimentation, filtration, chlorination
32	What is happening at each point of the heating curve?		A – substance is a solid, heating up B – Melting point - the attractive forces are being broken C – Substance is a liquid, heating up D – Boiling point – the attractive forces are being broken E – Substance is a gas, heating up

Topic 3 (can be tested on Paper 1) – Chemical Change

Q	Topic 3 Questions	Q	Topic 3 Answers
1	What ions do acids release in solution?	1	H⁺ (protons!)
2	What ions do alkalis release in	2	OH-
	solution?		
3	Acids are proton	3	Donors
4	Alkalis are proton	4	Acceptors
5	What is the pH of a neutral substance?	5	7
6	What is the pH of an acidic solution	6	Lower than 7
7	What is the pH of an alkaline solution?	7	8-14
8	In Universal indicator, what colour	8	Red/yellow/orange
	does an acidic solution turn?		

9	In Universal indicator, what colour does a neutral solution turn?	9	Green
10	In Universal indicator, what colour	10	Blue/purple
11	In phenolphthalein, what colour does	11	Colourless
12	In phenolphthalein, what colour does	12	Pink
13	In litmus, what colour does an acidic solution turn?	13	Red
14	In litmus, what colour does an alkaline solution turn?	14	Blue
15	In methyl orange, what colour does an acidic solution turn?	15	Red
16	In methyl orange, what colour does an alkaline solution turn?	16	Yellow
17	If you increase the concentration of hydrogen ions in a solution, what	17	It decreases
	happens to the pH?		
18	If you increase the concentration of	18	It decreases by 1
	hydrogen ions by a factor of 10, what		
	happens to the pH?		
19	Core practical – investigating the	19	There is often discrepancy between
	change in pH when adding calcium		judgements, it is subjective.
	hydroxide to hydrochloric acid – what		
	are the issues with Using Universal		
20	What is a more accurate method of	20	nH probe
20	measuring pH?	20	
21	What is the difference between	21	Concentrated solutions have more of the solute (more particles in the same volume)
22	Define strong gcid	22	An acid that fully dissociates in to its ions in
			solution
23	Define weak acid	23	An acid that partially dissociates into its ions in solution
24	When an acid reacts with a base,	24	Salt and water
	what is formed?		
25	What is an alkali?	25	A soluble base
26	Metal + acid →	26	Salt + hydrogen
2/	Metal oxide + acid ->	27	Salt + water
28			
29	Metal hydroxide + acid \rightarrow	28	Salt + water
1 4/1	Metal hydroxide + acid \rightarrow Metal carbonate + acid \rightarrow	28 29	Salt + water Salt + water + carbon dioxide
30	Metal hydroxide + acid → Metal carbonate + acid → Describe the gas test for hydrogen	28 29 30	Salt + water Salt + water + carbon dioxide Place a lighted splint in a test tube
30	Metal hydroxide + acid → Metal carbonate + acid → Describe the gas test for hydrogen	28 29 30	Salt + water Salt + water + carbon dioxide Place a lighted splint in a test tube containing the collected gas, if hydrogen is
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31	Metal hydroxide + acid → Metal carbonate + acid → Describe the gas test for hydrogen Describe the gas test for carbon dioxide	28 29 30 31	Salt + water Salt + water + carbon dioxide Place a lighted splint in a test tube containing the collected gas, if hydrogen is present you will hear a squeaky pop Bubble the gas evolved from the reaction through lime water (via a delivery tube). If
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31	Metal hydroxide + acid → Metal carbonate + acid → Describe the gas test for hydrogen Describe the gas test for carbon dioxide What type of reaction occurs between an acid and a base?	28 29 30 31 31 32	Salt + water Salt + water + carbon dioxide Place a lighted splint in a test tube containing the collected gas, if hydrogen is present you will hear a squeaky pop Bubble the gas evolved from the reaction through lime water (via a delivery tube). If carbon dioxide is present, the lime water will turn cloudy/milky. Neutralisation
30 31 32 33	Metal hydroxide + acid → Metal carbonate + acid → Describe the gas test for hydrogen Describe the gas test for carbon dioxide What type of reaction occurs between an acid and a base? Describe how and acid and an alkali	28 29 30 31 31 32 33	Salt + water Salt + water + carbon dioxide Place a lighted splint in a test tube containing the collected gas, if hydrogen is present you will hear a squeaky pop Bubble the gas evolved from the reaction through lime water (via a delivery tube). If carbon dioxide is present, the lime water will turn cloudy/milky. Neutralisation The H ⁺ ions from the acid react with the OH ⁻

34	When preparing soluble salts from acids, why do we use excess of the second reactant?	34	To ensure that all of the acid has reacted
35	How do we remove the excess reactant?	35	Filtration
36	After filtration, when reacting excess metal oxide and acid, what remains in the reaction mixture?	36	Salt and water only
37	If we are preparing a soluble salt using an acid and a soluble reactant, what method must be used?	37	Titration
38	During a titration, what is the name of the piece of apparatus that is used to measure 25cm ³ of solution for the conical flask?	38	Pipette
39	During a titration, what is the name of the piece of apparatus that stores 50cm ³ of solution and is used to slowly release a solution?	39	Burette
40	What is the purpose of carrying out a titration?	40	To produce salt and water only
41	What is the name of the point in which neutralisation is achieved during a titration?	41	End point
42	All common sodium, potassium and ammonium salts are	42	Soluble
43	All nitrates are	43	Soluble
44	Common chlorides are soluble except those of	44	Silver and lead
45	Common sulphates are soluble except those of	45	Lead, barium and calcium
46	Common carbonate and hydroxides are insoluble except those of	46	Sodium, potassium, ammonium
47	If you mix two reactants together and an insoluble salt if formed, what type of reaction is this?	47	A precipitation reaction
48	How do you prepare a sample of a pure, dry, insoluble salt?	48	Mix reactants together and filter – this way you can collect the precipitate. Once you have collected the precipitate, leave to dry in a warm place, or dry gently in an oven, or dry with filter paper.
49	What is an electrolyte?	49	An ionic compound which is either molten (liquid) or dissolved in water
50	What happens in electrolysis?	50	Electrical energy (direct current) is used to decompose (break down) an electrolyte
51	Positive ions are called?	51	Cations
52	Negative ions are called?	52	Anions
53	Positive ions are attracted to which electrode?	53	Negative (Cathode)
54	Negative ions are attracted to which electrode?	54	Positive (Anode)
55	Why are carbon electrodes used for electrolysis?	55	They are unreactive (inert)

56	What happens to positive ions in electrolysis?	56	Positive ions are attracted to the negative electrode where they gain electrons. They are REDUCED
57	What happens to negative ions in electrolysis?	57	Negative ions are attracted to the positive electrode where they lose electrons. They are OXIDISED
58	What are the products if copper chloride is electrolysed?	58	Copper (Negative electrode) and Chlorine (Positive electrode)
59	Write a half equation to show how	59	Cu ²⁺ + 2e ⁻ → Cu
	copper atoms are formed at the cathode		
60	Write a half equation to show how chlorine aas is formed at the cathode	60	2Cl [.] → Cl ₂ + 2e [.]
61	What is oxidation?	61	Loss of electrons
62	What is reduction?	62	Gain of electrons
63	What is a redox reaction?	63	A reaction where both reduction and oxidation take place
64	What reaction happens at the anode?	64	Oxidation (negative ions lose electrons)
65	What reaction happens at the cathode?	65	Reduction (positive ions gain electrons)
66	What ions are present in NaCl solution?	66	Na ⁺ , Cl ⁻ , H ⁺ and OH ⁻
67	What are the products when NaCl solution is electrolysed?	67	Hydrogen (cathode), Chlorine (anode) and Sodium hydroxide (in solution)
68	How do you test for Cl ₂ gas?	68	Damp blue litmus paper which turns red then white
69	What ions are present in copper sulphate solution?	69	Cu^{2+} , $SO_{4^{2-}}$, H^+ and OH^-
70	What are the products when copper sulphate solution is electrolysed with carbon electrodes?	70	Copper (cathode) and Oxygen (anode)
71	Which product is made in the electrolysis of solutions – H2 or metal?	71	H ₂ if the metal is more reactive than hydrogen, metal if hydrogen is more reactive than the metal
72	Which product is made in the electrolysis of solutions if OH ⁻ or halide (Cl ⁻ , Br ⁻ or I ⁻) is present?	72	Halogen made if halide ion present, oxygen and water if no halide ion present
73	Write a half-equation to show the reaction at the anode for CuSO4 solution electrolysis with carbon electrodes	73	2O ²⁻ → O ₂ + 4e ⁻
74	Write a half-equation to show the reaction at the cathode for CuSO4 solution electrolysis with carbon electrodes	74	Cu²+ + 2e- → Cu
75	What happens at the anode if copper electrodes are used in the electrolysis of CuSO4 solution	75	The electrode gets smaller as Cu atoms are changed into Cu ²⁺ ions: Cu →Cu ²⁺ + 2e ⁻
76	What happens at the cathode if copper electrodes are used in the electrolysis of CuSO4 solution	76	The electrode gets bigger as Cu ²⁺ ions are changed into Cu atoms: Cu ²⁺ + 2e ⁻ → Cu
77	Why is propanone used to rinse electrodes?	77	It evaporates quickly and helps to dry the electrode properly

78	Describe how copper can be purified using the electrolysis of CuSO4	78	Impure copper is the anode, the copper atoms turn into copper ions by losing electrons Copper ions in electrolyte attracted to pure copper cathode Copper ions gain electrons and turn into copper atoms. Impurities collect as sludge at the bottom of the tank
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Topic 4 (will be tested on Paper 1)

Q	Topic 4 Questions	Q	Topic 4 answers
17	What is the reactivity series?	17	A list of metals in order of their reactivity,
			potassium is at the top and gold at the
			bottom
18	What is the equation for a metal	18	metal + water \rightarrow metal + hydrogen
	reacting with water?		hydroxide
19	What is the equation for a metal	19	metal + water \rightarrow metal + hydrogen
	reacting with steam?		oxide
20	What is the equation for a metal	20	metal + acid \rightarrow metal + hydrogen
	reacting with an acid?		salt
21	Put these metals in order of reactivity:	21	Potassium, magnesium, zinc, iron, gold
	iron, zinc, gold, magnesium, potassium		
22	Which metals form cations more easily	22	More reactive lose their electrons to form
	– reactive or unreactive?		cations more easily
23	What is a displacement reaction?	23	A reaction where a more reactive metal
			replaces a less reactive one in a compound
24	Why is a displacement reaction a	24	The more reactive metal loses electrons to
	redox reaction?		form a cation (oxidation), the less reactive
			metal cation gains electrons to form an
			atom (reduction)
25	Write the reaction of magnesium with	25	Oxidation
	iron sulphate as an ionic equation,		Mg + Fe ²⁺ \rightarrow Mg ²⁺ + Fe
	label the equations as oxidation and		Reduction
	reduction		
26	What is an ore?	26	A rock that contains enough metal to make
			it worth extracting economically
27	What are native metals?	27	Very unreactive metals like gold and
			platinum which are found uncombined in
			the ground
28	How can zinc, iron and copper be	28	The metal oxide is heated with carbon, the
	extracted using carbon?		carbon displaces the metal from its oxide as
			it is more reactive
29	What happens to metal ores when	29	The metal ores lose oxygen so they are
	they are heated with carbon?		reduced
30	What is the word equation for the	30	
	extraction of iron from iron oxide using		Iron oxide + carbon \rightarrow iron + carbon dioxide
	carbon?	1	
31	How are metals more reactive than	31	Electrolysis of the molten metal oxide is
31	How are metals more reactive than carbon extracted?	31	Electrolysis of the molten metal oxide is needed, which requires lots of heat energy
31	How are metals more reactive than carbon extracted?	31	Electrolysis of the molten metal oxide is needed, which requires lots of heat energy (to melt the oxide) and electrical energy (to

32	Describe the process of phytomining	32	Plants are grown in soil containing metal compound. They absorb the metal compounds and are burnt to form ash from which the metal is extracted
33	Describe the process of bioleaching	33	Bacteria are grown on a low grade ore. They produce a solution called a leachate which contains the metal. This can be extracted and then purified using electrolysis
34	Describe how aluminium is extracted	34	Aluminium ore (bauxite) is melted at a temperature of 1000 °C with cryolite. Al ³⁺ ions are reduced to Al at the cathode, O ²⁻ ions are oxidised to O ₂ at the anode. The graphite electrodes react with the O ₂ and wear away as CO ₂ is made
35	What is corrosion?	35	Weakening of metal due to its reaction with oxygen over time
36	What is rusting?	36	The reaction of oxygen and water with iron
37	Which metals corrode most easily?	37	More reactive metals corrode most easily
38	What is tarnish?	38	A protective layer of metal oxide which prevents further corrosion (in aluminium)
39	What are the advantages of recycling metals?	39	Conserves metal reserves, mining is reduced (damages landscape and habitats), less pollution is produced (e.g. CO ₂ and SO ₂), less waste goes to landfill
40	What are the stages of a life-cycle assessment?	40	The effect on the environment of extracting the raw materials, manufacturing and distributing the product, using the product and disposing of the product when it is no longer useful
41	What is a reversible reaction and how do we show a reaction is reversible?	41	A reaction that can go forwards and backwards. It has the symbol ≓
42	What is a dynamic equilibrium?	42	A reversible reaction where the rate of the forward reaction is equal to the rate of the reverse reaction
43	What is the equation and the conditions used in the Haber Process?	43	$N_2 + 3H_2 \rightleftharpoons 2NH_3$
44	Where do the nitrogen and hydrogen used in the Haber Process come from?	44	Nitrogen comes from the air Hydrogen comes from natural gas
45	What is the effect of temperature on a dynamic equilibrium?	45	Increasing the temperature shifts the reaction in the endothermic direction to cool it down. Decreasing the temperature shifts the reaction in the exothermic direction to heat it up
46	What is the effect of concentration on	46	Increasing the concentration will cause
	a dynamic equilibrium?		equilibrium to shift in the direction that uses
			up the added substance to reduce it.
			Decreasing the concentration will cause
			equilibrium to shift in the direction that
			makes more of the added substance to
47	What is the offeet of pressure on a	47	replace if
4/	dynamic equilibrium?	4/	the direction that forms fewer molecules to
			reduce the pressure.

	Decreasing the pressure shifts the reaction in the direction that forms more molecules to
	increase me pressure

Topic 6 (tested on Paper 2)

Q	Topic 6 Questions	Q	Topic 6 answers
<u>Gro</u>	<u>pup 1</u>		
1	What is the name of the group 1 elements?	1	Alkali metals
2	What is the name of the group 7 elements?	2	halogens
3	Give 2 physical properties of group 1 elements	3	They are soft They have low melting and boiling points
4	What is the pattern of reactivity in aroup 1?	4	As you go down the group, the elements become more reactive
5	What happens to group 1 elements as they react?	5	They lose an electron
6	Why do group 1 elements get more reactive down the group? (3 points)	6	 Increased distance of outer shells from nucleus More shells so more shielding from the nucleus (repulsion from inner shells) Outer electron feels less attraction to nucleus Takes less energy to remove the outer electron
7	describe what you would see when group 1 metals react with water	7	 Fizzing, metal dissolves (for all 3) Reactions get more vigorous as you go down the group Potassium – lilac flame
8	Give a word and symbol equation for the reaction of lithium with water	8	Lithium + water \rightarrow lithium hydroxide + hydrogen2Li + 2H_2O \rightarrow 2LiOH + H_2
9	Give a word and symbol equation for the reaction of sodium with water	9	sodium + water \rightarrow sodium hydroxide + hydrogen 2Na + 2H ₂ O \rightarrow 2NaOH + H ₂
10	Give a word and symbol equation for the reaction of potassium with water	10	potassium + water \rightarrow potassium hydroxide + hydrogen 2K + 2H ₂ O \rightarrow 2KOH + 2H ₂
Gro	<u>oup 7</u>		
11	What is the name of the group 7 elements?	11	halogens
12	Describe the physical appearance of Cl ₂ Br ₂ and l ₂ and their state at RTP	12	Cl ₂ – green/yellow gas Br ₂ – Brown/red liquid I ₂ - dark grey solid
13	What is the pattern of boiling points for halogens?	13	Their boiling points increase as you go down the group
14	What is the chemical test for chlorine?	14	It turns damp blue litmus paper turn RED first, then BLEACHES IT WHITE
15	What happens when halogens react with metals?	15	They react to form metal halide salts Sodium + chlorine \rightarrow sodium chloride 2Na(s) + Cl ₂ (g) \rightarrow 2NaCl(s)
16	What do hydrogen halides form when dissolved in water?	16	Acids eg. HCI (aq) is hydrochloric acid.

17	What is the pattern of reactivity with group 7 elements?	17	As you go down the group the elements get less reactive
18	Explain the reactivity of group 7 elements	18	 Further down the group: incoming electron is further from nucleus increased shielding from nucleus harder to attract an electron
19	What is a displacement reaction?	19	Where a more reactive element takes the place of a less reactive element
20	Describe the displacement reactions of the halogens	20	Chlorine is able to displace bromine and iodine Bromine can displace iodine but NOT chlorine Iodine cannot displace either chlorine or bromine
21	Describe how the displacement reactions of halogens are redox reactions	21	The more reactive element is reduced as it gains electrons The less reactive element is oxidised as it loses electrons
22	Give an example of an ionic equation for a displacement reaction of a halogen (include half equations)	22	Full ionic equation: $Cl_2(aq) + 2Br(aq) \rightarrow 2Cl(aq) + Br_2(aq)$ Half equations: $Cl_2(aq) + 2e^- \rightarrow 2Cl(aq)$, (reduction) $2Br(aq) \rightarrow Br_2(aq) + 2e^-$, (oxidation)
Gro	<u>0 quo</u>	1	
23	What is the name of the group 0 elements?	23	Noble gases
24	Describe the reactivity of the group 0 elements	24	They are unreactive
25	What happens to the melting and boiling points of the group 0 elements as you go down the group?	25	They increase
26	What are the three main physical properties of group 0 elements?	26	They are inert (unreactive) They are non-flammable They have a low density
27	What happens to the density of group 0 elements as you descend the group?	27	The density increases

Topic 7 (tested on Paper 2)

Q	Topic 7 Questions	Q	Topic 7 answers
1	What observations could you make to	1	Colour change, change in mass,
	taking place?		change (hot/cold).
2	What two methods could you measure the production of a gas?	2	1. Collect the gas in an upside down measuring cylinder full of water, or gas syringe

			2. Measure the change in mass at the start and end of a reaction.
3	If a colour change occurs, what method could you use to measure how quickly it formed?	3	Time how long it takes for a cross to disappear under the reaction.
4	What must particles do in order to react?	4	Collide.
5	What would need to happen to the number of collisions if you wanted the reaction to slow down?	5	You would need fewer collisions.
6	How would the energy of the particles need to change if you wanted the reaction to go faster?	6	The particles would need more energy.
7	Sometimes particles don't react even if they collide: explain why?	7	Particles need to collide with sufficient energy, so collisions need to be successful.
8	What are the four factors that can influence the rate of a reaction?	8	Temperature, surface area, concentration (pressure of a gas) and catalysts.
9	Why does a higher temperature make reactions faster?	9	The particles have more energy so collide more often with enough energy.
10	Why does a higher concentration	10	There are more particles in the same volume
11	Why does a higher pressure make	11	There are more particles in the same volume
12	Why does a larger surface area make	12	There is more area for the particles to collide with the solid
13	On the graph, where is the reaction a) Slowing down? b) Fastest? c) Stopped?	13	Virial field of the solid of th
14	In graph form, how would you show the change in number of reactant and product particles?	14	
15	Which line on this graph represents a faster reaction?	15	The last of center
16	What is a catalyst	16	A substance that speeds up the rate of a

			reaction without altering the products of the reaction, being itself unchanged chemically and in mass at the end of the reaction.
17	What is activation energy?	17	The activation energy is the minimum amount of energy needed for a collision to be successful.
18	How does a catalyst increase the rate of a reaction?	18	A catalyst provides an alternative reaction pathway that has a lower activation energy than the uncatalysed reaction.
19	What happens to the collisions when a catalyst is used?	19	This does not change the frequency of collisions, but increase the frequency of successful collisions because a greater proportion of collisions now exceeds the activation energy.
20	Which line represents a reaction with a catalyst?	20	Have the second se
21	What is a biological catalyst?	21	An enzyme
	for?		Making alcoholic arinks (feast)
23	What type of reactions can result in a change in temperature?	23	 Dissolving salts. Neutralisation. Displacement. Precipitation.
24	What is an exothermic reaction?	24	A reaction in which heat energy is given out.
25	What is an endothermic reaction?	25	A reaction in which heat energy is taken in.
26	When bonds are broken, the process is endothermic, true or false.	26	True
27	If more heat energy is released in forming bonds in the products than is required in breaking bonds in the reactants what type of reaction is it?	27	Exothermic
28	What type of reaction does this energy diagram represent?	28	Exothermic
29	What type of reaction does this energy diagram represent?	29	Endothermic

30 Label the activation energy of the energy diagram.	Fogues of vestors
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Topic 8 (tested on Paper 2)

Q	Topic 8 Questions	Q	Topic 8 answers			
<u>Top</u>	Topic 8a – crude oil					
1	What is a hydrocarbon?	1	A molecule made up of hydrogen and carbon ONLY			
2	What is crude oil? GIVE 3 SPECIFIC ANSWERS	2	a complex mixture of hydrocarbons in chains or rings important source of fuels a finite resource			
3	What is the process by which crude oil is separated into simpler, more useful mixtures?	3	fractional distillation – the oil is <u>heated</u> to vapourise it, the vapours enter the column and <u>condense</u> where it is cooler			
4	What physical property does fractional distillation rely upon?	4	Different boiling points			
5	Give some uses of the different fractions	5	 a. gases, used in domestic heating and cooking b. petrol, used as fuel for cars c. kerosene, used as fuel for aircraft d. diesel oil, used as fuel for some cars and trains e. fuel oil, used as fuel for large ships and in some power stations f. bitumen, used to surface roads and roofs 			
6	How do different fractions differ in terms of their physical properties?	6	As chain length increases: viscosity <u>increases</u> volatility and flammability decrease			
7	Define homologous series	7	 a. have the same general formula, b. differ by CH₂ in molecular formulae from neighbouring compounds, c. have similar chemical properties 			
8	What are the products of complete combustion of hydrocarbons?	8	carbon dioxide and water are produced energy is given out.			
9	When does incomplete combustion take place?	9	Where there is a lack of oxygen			
10	What are the products of incomplete combustion?	10	carbon (soot) and carbon monoxide and water			
11	How does carbon monoxide behave as a toxic gas?	11	Binds to haemoglobin in the red blood cells, stops it carrying oxygen			
12	How does burning fossil fuels form acid rain?	12	Sulphur impurities in the fuel react with oxygen to form SO ₂ which dissolves in rainwater to form acid rain			

13	What environmental problem does sulphur dioxide call?	13	Acid rain
14	How does acid rain damage the environment?	14	Damages buildings (especially limestone) Acidifies lakes and streams – kills aquatic life Acidifies soil – harmful to plants
15	How are oxides of nitrogen formed in vehicles?	15	High temperatures in engines cause oxygen and nitrogen from the air to react together and produce oxides of nitrogen
16	Define cracking	16	The breaking down of larger, saturated hydrocarbon molecules (alkanes) into smaller, more useful ones, some of which are unsaturated (alkenes). This is a thermal decomposition reaction
17	Why is cracking necessary?	17	There is a high demand for short chain hydrocarbons, but a low supply. However, there is a low demand for long chain hydrocarbons, but a large supply. Cracking helps meet the demand for short chain hydrocarbons
18	What are advantages of fossil fuels?	18	They produce energy They are readily available Our infrastructure is built to use them
19	What are disadvantages of fossil fuels?	19	They produce carbon dioxide – contributes to global warming They produce soot – contributes to global dimming and causes breathing problems, coats vehicles They produce sulphur dioxide – acid rain They are non-renewable and running out Their extraction can cause environmental disasters
20	What are the advantages of using hydrogen as a fuel?	20	Only produces water when burned Is very energy efficient Can be made from renewable resources
21	What are the disadvantages of using hydrogen as a fuel?	21	most hydrogen comes from crude oil which is non renewable; H ₂ is a gas – hard to store/transport; H ₂ is flammable – could explode if car crashes; Our infrastructure not set up to use hydrogen
22	Define saturated hydrocarbon	22	a hydrocarbon which contains single bonds . between hydrogen and carbon only
23	Define unsaturated hydrocarbon	23	a hydrocarbon which contains at least 1 C=C double bond
Тор	ic 8b – earth and atmospheric science		
24	What caused the earth's early atmosphere to form?	24	Volcanic Activity
25	What was the earth's early atmosphere composed of?	25	a little or no oxygen b a large amount of carbon dioxide c water vapour d small amounts of other gases
26	How did the oceans form?	26	Water vapour released by volcanoes (and possibly from comets) cooled, and condensed, fell as rain forming the oceans

27	Explain how the carbon dioxide levels	27	Primitive plants formed. They
	decreased and the oxygen levels		photosynthesised forming oxygen and
	increased on earth		removing carbon dioxide
28	What is the chemical test for oxygen?	28	Oxygen relights a glowing splint
29	What is the greenhouse effect?	29	The gradual warming of the earth by gases which absorb infra-red radiation and reflect it
			back to earth
30	Which gases are responsible for the greenhouse effect?	30	Carbon dioxide, methane, water vapour
31	What evidence exists for human activity causing climate change?	31	As our use of fossil fuels has increased, the level of carbon dioxide in the atmosphere has increased. There has been a corresponding increase in the earth's average surface temperature. However – it is hard to be entirely sure about this as historical methods of measuring carbon dioxide levels were flawed. We cannot be sure of the locations for all these measurements
32	What is the composition of the current atmosphere?	32	78% nitrogen 21% oxygen 0.04% carbon dioxide <1% argon and other gases
33	What are the potential risks associated with global warming?	33	Extreme weather patterns Melting ice caps Flooding low lying areas Leading to Loss of life
34	Where do the greenhouse gases come from?	34	Carbon dioxide – burning fossil fuels in engines and power stations Methane – livestock farming
35	Name three ways we could mitigate these effects	35	Carbon capture and storage (put it underground) Use alternative fuels Plant more trees