Q&A List - GCSE Combined Since - Chemistry Paper 1

Part 1a - Atoms, Elements, Compounds & Mixtures

No.	Question	Answer
1	What 3 sub-atomic particles are found in an atom?	Proton Neutron Electron
2	Which sub-atomic particles are found in the nucleus?	Protons and neutrons
3	Which sub-atomic particles are found in the shells?	Electrons
4	What is the radius of an atom?	1×10^{-10} m
5	What is the radius of the nucleus of an atom?	1×10^{-14}m
6	Which sub-atomic particle has no charge (neutral)?	Neutron
7	Which sub-atomic particle has a positive charge?	Proton
8	Which sub-atomic particle has a negative charge?	Electron
9	Which sub-atomic particle has a very small mass?	Electron
10	Which sub-atomic particles have a mass of 1?	Protons and neutrons
11	Why are atoms neutral overall?	Equal numbers of protons (+) and electrons (-)
12	The atomic number of an atom is the same as the number of what?	Protons
13	The mass number of an atom is the same as what?	Protons and neutrons added together
14	1. How many of each sub-atomic particle are found in the following atom? $^{23}_{11}Na$	11 protons 11 electrons 12 neutrons
15	An isotope has the same number of _____ and _____ but different numbers of _____.	Protons Electrons Neutrons
16	The relative atomic mass of an element is the average of the mass of all the different _____.	Isotopes
17	Chlorine exists in two forms. 75% has a mass of 35, 25% has a mass of 37. Calculate the relative atomic mass of the element.	$\frac{(75 \times 35) + (25 \times 37)}{100}$ = 35.5
18	There are about _____ different elements.	100

19	What do we call a molecule containing 2 or more different elements chemically bonded together?	Compound
20	Write the word equation for the reaction between magnesium (Mg) and oxygen (O_2) to form magnesium oxide (MgO).	Magnesium + Oxygen → Magnesium Oxide
21	Write the balanced symbol equation for the reaction above.	$2Mg + O_2 \rightarrow 2MgO$
22	Mixtures are made of compounds and/or elements that _____.	Are not chemically joined
23	The chemical properties of the individual substances in a mixture are _____.	Unaltered
24	Filtration is used to separate an _____ solid from a solution.	Insoluble
25	What separating technique would you use to separate a soluble solid (eg. Salt) from water?	Crystallisation
26	How would you separate two liquids with different boiling points?	Distillation
27	What technique would you use to separate a number of different liquids that all have different boiling points.	Fractional distillation
28	Give one reason why scientific theories keep changing.	New evidence is found
29	Originally atoms were thought to be tiny solid spheres. The plum pudding model suggested the atom was a ball of positive charge with _____ embedded in it.	Electrons
30	Rutherford's alpha particle scattering experiment proved that that most of the mass is in __ _____ of the atom. This is the nuclear model.	The nucleus
31	How did Bohr change the nuclear model?	He said electrons orbit the nucleus in shells
32	Whose work led to the discovery of the neutron?	Chadwick
33	How many electrons can you put into the first shell?	2
34	How many electrons can you put in the second and third shells?	8
35	What is the name given to atoms of the same element which have different numbers of neutrons but the same number of protons?	Isotopes

Part 1b - The Periodic Table

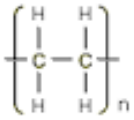
No.	Question	Answer
1	Before protons, neutrons and electrons were discovered, scientists tried to classify elements by arranging them in order of their atomic	Mass

	_____. But did not consider their properties.	
2	_____ realised that he needed to leave gaps for undiscovered elements.	Mendeleev
3	Why did people come to believe that he was correct?	They discovered elements that fit into the gaps.
4	The existence of _____ means it is better to arrange the elements in order of atomic number as in the modern periodic table.	Isotopes
5	Elements with similar properties are found in the same column – these are called _____.	Groups
6	What is similar about the electronic structure of elements in the same column on the periodic table?	They have the same number of electrons in the outer shell.
7	Most elements in the periodic table are _____.	Metals
8	Where on the periodic table do you find the metals?	On the left
9	Where on the periodic table do you find the non-metals?	On the right
10	What is group 0 on the periodic table also called?	Noble gases
11	Why are the elements in group 0 unreactive?	They already have full outer shells
12	As you go down group 0, what happens to the boiling point of the elements?	Increases
13	What is group 1 on the periodic table also known as?	Alkali metals
14	How many electrons are in the outside shell of the elements in group 1?	1
15	What happens to the electrons in the outside shell when group 1 elements react?	They lose the electron in the outer shell
16	What ion do group 1 elements form when they react?	+1
17	What happens to the melting and boiling points as you go down group 1?	Decreases
18	What 2 products do you make when lithium reacts with water?	Hydrogen Lithium hydroxide
19	Give 3 observations you could make in this reaction.	Floats - Moves - Fizzes Universal indicator changes from green to purple
20	What do you make when you react sodium with chlorine?	Sodium Chloride
21	What do you make when lithium reacts with oxygen?	Lithium oxide
22	The elements in group 7 are known as the _____.	Halogens
23	Group 7 elements are diatomic. What does this mean?	2 atoms

24	What happens to the reactivity of group 7 as you go down the group?	Decreases
25	What happens to the melting and boiling points of the group 7 elements as you go down the group?	Increases
26	What happens to the electrons when group 7 elements react?	They gain 1 electron
27	What type of reaction takes place when a more reactive halogen takes the place of a less reactive halogen?	Displacement
28	What ion do group 7 elements form?	1-
29	When group 7 elements react with group 1, what sort of bonds do they make?	Ionic
30	A _____ reactive group 7 element will displace a _____ reactive one from an aqueous solution of its salt.	More Less

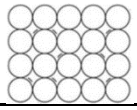
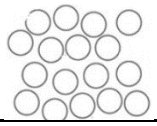
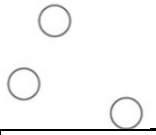
Part 2a - Bonding & Structure

No.	Question	Answer
1	Metals lose electrons to form _____ ions	Positive
2	Non-metals gain electrons to form _____ ions.	Negative
3	The ions formed by elements in groups 1,2,6 and 7 form ions with full outer shells like the _____ _____.	Noble gases
4	What charge is on the ions formed by atoms in group one?	+1
5	What charge do the ions formed from atoms in group 6 have?	2-
6	What types of elements form ionic bonds?	Metal and non-metal
7	What happens to the electrons in an ionic bond?	They are transferred from the metal to the non-metal
8	The ions in an ionic bond are held together by an _____ _____	Electrostatic attraction
9	The ions in ionic compounds form giant structures called _____.	Lattices
10	The bonds in an ionic compound are _____.	Strong
11	Ionic compounds have _____ melting and boiling points.	High

12	Why don't ionic compounds conduct electricity as solids?	The ions cannot move
13	What 2 things can you do to make ionic compounds conduct electricity?	Melt Dissolve
14	What type of elements form covalent bonds?	Non-metals
15	What happens to the electrons in a covalent bond?	Shared
16	Covalent compounds usually exist as _____ molecules.	Simple
17	Covalent molecules usually have _____ melting and boiling points.	Low
18	This is because the intermolecular forces between the molecules are _____.	Weak
19	What happens to the strength of the intermolecular forces as the molecules get bigger?	They increase
20	Why don't covalent molecules conduct electricity?	No free ions or electrons
21	What type of molecule does this diagram represent? 	Polymer
22	Why are these types of molecules solids at room temperature?	The intermolecular forces are stronger
23	What type of structure do diamond, graphite and silicon dioxide have?	Giant covalent
24	Why do these molecules have high melting and boiling points?	Held by strong covalent bonds
25	Why is diamond hard?	Has a rigid structure
26	Why doesn't diamond conduct electricity?	No free electrons
27	Why is graphite slippery?	The layers are only held together by weak intermolecular forces.
28	Why does graphite conduct electricity?	Has delocalised (free) electrons
29	Why is graphene used in electronics?	Conducts electricity
30	Give two examples of fullerenes and give a use for each.	1 Name: Buckminster fullerene Use: cage medicines 2

		Name: nanotubes Use: strengthen tennis rackets
31	What type of elements from metallic bonds?	Metals
32	Why do metals usually have high melting and boiling points?	Strong bonds
33	Why can metals conduct heat and electricity?	Contain delocalised (free) electrons
34	Why can metals be bent and shaped?	The layers can slide over each other
35	Why are alloys usually harder than pure metals?	The different size atoms stop the layers sliding over each other.

Part 2b - States of Matter

No.	Question	Answer
1	Draw a diagram to show the particles in a solid.	
2	Draw a diagram to show the particles in a liquid.	
3	Draw a diagram to show the particles in a gas.	
4	Give a limitation of the particle model to show the different states of matter.	Atoms aren't solid spheres
5	What do the state symbols (s), (l), (aq) and (g) mean?	(s) - solid (l) - liquid (aq) - aqueous (g) - gas
6	Changing from a solid to liquid is called _____.	Melting
7	Changing from a gas to a liquid is called _____.	Condensing
8	Changing from a liquid to a solid is called _____.	Freezing
9	Changing from a liquid to a gas is called _____.	evaporating
10	The melting point of bromine is -7.2 °C and its boiling point is 58.8 °C. What state will it be at room temperature (20°C)?	liquid

Part 3 - Quantitative Chemistry

No.	Question	Answer
1	You calculate the relative formula mass of a substance by adding up the _____ _____ _____ of all the atoms in its formula.	Relative atomic mass
2	What is the equation to calculate percentage mass of a substance?	Percentage = mass of element x 100 Composition mass of whole formula
3	The law of_____ _____ _____ states that the mass of the reactants is always equal to the mass of the products.	Conservation of mass
4	This is because no atoms can be _____ or _____.	Made Destroyed
5	If the mass of the substances in a reaction seem to increase it's usually because one of the - _____ is a gas.	Reactants
6	If the mass of the substances in a reaction seem to decrease it's usually because one of the - _____ is a gas.	Products
7	This is because in a gas the particles will _____ _____- to fill the container they are in.	Spread out
8	The concentration of a solution can be measured in mass per given _____ of solution.	Volume
9	2. Concentration is calculated using this equation Concentration =	Mass Volume
10	The units for concentration are _____.	g/dm^3
11	What happens to the concentration of the solution as you add more solute?	Becomes more concentrated

Part 4 - Chemical Changes

No.	Question	Answer
1	The pH scale runs from 0 to ____.	14
2	What ions do acids produce in aqueous solutions?	H^+ (HYDROGEN)
3	What ions do alkaline solutions contain?	OH^- (HYDROXIDE)
4	Acids have a pH of below _____.	7

5	Write the equation to produce water in a neutralisation reaction.	$H^+ + OH^- \rightarrow H_2O$
6	Acid + Metal hydroxide → _____ + _____	Salt + water
7	Acid + Metal Oxide → _____ + _____	Salt + water
8	The first part of a salts name comes from the _____.	metal
9	The second part of a salts name comes from the _____.	acid
10	Hydrochloric acid forms _____ salts.	Chloride
11	Nitric acid forms - _____ salts.	Nitrate
12	Sulphuric acid forms _____salts.	Sulphate
13	To make a sample of a soluble salt you mix an acid and an insoluble base. Remove the excess insoluble base using _____. To remove the soluble salt from the solution you need to use _____.	Filtration, crystallisation
14	The more reactive a metal is, the more easily it can form _____ _____.	Positive ions
15	Metal + Acid → _____ + _____	Salt + hydrogen
16	Some metals react with water to make _____ _____ and _____	Metal hydroxide + hydrogen
17	A more reactive metal will _____ a less reactive one.	displace
18	Most metals are found in the earth as compounds and need to be extracted from their _____.	Ore
19	_____ is the gain of oxygen.	Oxidation
20	_____ is the loss of oxygen.	Reduction
21	If a metal is less reactive than carbon it can be extracted by _____.	Reduction by carbon
22	If a metal is more reactive than carbon it has to be extracted by _____.	Electrolysis

23	An ionic compound can be broken down if an electric current is passed through it if is _____ or _____.	Molten, dissolved
24	Electrolytes are substances that contain _____ ions.	Free
25	What charge do metal ions have?	Positive
26	What charge do non-metal ions have?	Negative
27	During electrolysis the positive ions move towards the _____ electrode.	Negative
28	When an ionic compound is electrolysed the metal forms at the _____ electrode.	Negative
29	When an ionic compound is electrolysed the non- metal forms at the _____ electrode.	Positive
30	Aluminium oxide is dissolved in molten _____ before it is electrolysed because it reduces the temperature it melts at.	Cryolite
31	When aluminium oxide is electrolysed, what forms at the positive electrode?	Oxygen
32	The gas that is produced at the positive electrode when aluminium oxide is electrolysed reacts with the carbon electrode to form _____ _____.	Carbon dioxide
33	Why can't aluminium be extracted by reduction with carbon?	Aluminium is more reactive than carbon.
34	When water is electrolysed, what ions does it break down into?	H^+ and OH^-
35	In electrolysis, the two electrodes are put into the _____.	Electrolyte

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TEST YOURSELF - Part 1a - Atoms, Elements, Compounds & Mixtures

No.	Question	Answer
1	What 3 sub-atomic particles are found in an atom?	
2	Which sub-atomic particles are found in the nucleus?	
3	Which sub-atomic particles are found in the shells?	
4	What is the radius of an atom?	
5	What is the radius of the nucleus of an atom?	
6	Which sub-atomic particle has no charge (neutral)?	
7	Which sub-atomic particle has a positive charge?	
8	Which sub-atomic particle has a negative charge?	
9	Which sub-atomic particle has a very small mass?	
10	Which sub-atomic particles have a mass of 1?	
11	Why are atoms neutral overall?	
12	The atomic number of an atom is the same as the number of what?	
13	The mass number of an atom is the same as what?	
14	1. How many of each sub-atomic particle are found in the following atom? $^{23}_{11}Na$	
15	An isotope has the same number of _____ and _____ but different numbers of _____.	
16	The relative atomic mass of an element is the average of the mass of all the different _____.	
17	Chlorine exists in two forms. 75% has a mass of 35, 25% has a mass of 37. Calculate the relative atomic mass of the element.	
18	There are about _____ different elements.	

19	What do we call a molecule containing 2 or more different elements chemically bonded together?	
20	Write the word equation for the reaction between magnesium (Mg) and oxygen (O_2) to form magnesium oxide (MgO).	
21	Write the balanced symbol equation for the reaction above.	
22	Mixtures are made of compounds and/or elements that _____.	
23	The chemical properties of the individual substances in a mixture are _____.	
24	Filtration is used to separate an _____ solid from a solution.	
25	What separating technique would you use to separate a soluble solid (eg. Salt) from water?	
26	How would you separate two liquids with different boiling points?	
27	What technique would you use to separate a number of different liquids that all have different boiling points.	
28	Give one reason why scientific theories keep changing.	
29	Originally atoms were thought to be tiny solid spheres. The plum pudding model suggested the atom was a ball of positive charge with _____ embedded in it.	
30	Rutherford's alpha particle scattering experiment proved that that most of the mass is in __ _____ of the atom. This is the nuclear model.	
31	How did Bohr change the nuclear model?	
32	Whose work led to the discovery of the neutron?	
33	How many electrons can you put into the first shell?	
34	How many electrons can you put in the second and third shells?	
35	What is the name given to atoms of the same element which have different numbers of neutrons but the same number of protons?	

TEST YOURSELF - Part 1b - The Periodic Table

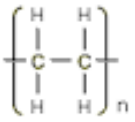
No.	Question	Answer
1	Before protons, neutrons and electrons were discovered, scientists tried to classify elements by arranging them in order of their atomic	

	_____. But did not consider their properties.	
2	_____ realised that he needed to leave gaps for undiscovered elements.	
3	Why did people come to believe that he was correct?	
4	The existence of _____ means it is better to arrange the elements in order of atomic number as in the modern periodic table.	
5	Elements with similar properties are found in the same column – these are called _____.	
6	What is similar about the electronic structure of elements in the same column on the periodic table?	
7	Most elements in the periodic table are _____.	
8	Where on the periodic table do you find the metals?	
9	Where on the periodic table do you find the non-metals?	
10	What is group 0 on the periodic table also called?	
11	Why are the elements in group 0 unreactive?	
12	As you go down group 0, what happens to the boiling point of the elements?	
13	What is group 1 on the periodic table also known as?	
14	How many electrons are in the outside shell of the elements in group 1?	1
15	What happens to the electrons in the outside shell when group 1 elements react?	
16	What ion do group 1 elements form when they react?	
17	What happens to the melting and boiling points as you go down group 1?	
18	What 2 products do you make when lithium reacts with water?	
19	Give 3 observations you could make in this reaction.	
20	What do you make when you react sodium with chlorine?	
21	What do you make when lithium reacts with oxygen?	
22	The elements in group 7 are known as the _____.	
23	Group 7 elements are diatomic. What does this mean?	

24	What happens to the reactivity of group 7 as you go down the group?	
25	What happens to the melting and boiling points of the group 7 elements as you go down the group?	
26	What happens to the electrons when group 7 elements react?	
27	What type of reaction takes place when a more reactive halogen takes the place of a less reactive halogen?	
28	What ion do group 7 elements form?	
29	When group 7 elements react with group 1, what sort of bonds do they make?	
30	A _____ reactive group 7 element will displace a _____ reactive one from an aqueous solution of its salt.	

TEST YOURSELF - Part 2a - Bonding & Structure

No.	Question	Answer
1	Metals lose electrons to form _____ ions	
2	Non-metals gain electrons to form _____ ions.	
3	The ions formed by elements in groups 1,2,6 and 7 form ions with full outer shells like the _____ _____.	
4	What charge is on the ions formed by atoms in group one?	
5	What charge do the ions formed from atoms in group 6 have?	
6	What types of elements form ionic bonds?	
7	What happens to the electrons in an ionic bond?	
8	The ions in an ionic bond are held together by an _____ _____	
9	The ions in ionic compounds form giant structures called _____.	
10	The bonds in an ionic compound are _____.	
11	Ionic compounds have _____ melting and boiling points.	
12	Why don't ionic compounds conduct electricity as solids?	
13	What 2 things can you do to make ionic compounds conduct electricity?	
	What type of elements form covalent bonds?	

14		
15	What happens to the electrons in a covalent bond?	
16	Covalent compounds usually exist as _____ molecules.	
17	Covalent molecules usually have _____ melting and boiling points.	
18	This is because the intermolecular forces between the molecules are _____.	
19	What happens to the strength of the intermolecular forces as the molecules get bigger?	
20	Why don't covalent molecules conduct electricity?	
21	What type of molecule does this diagram represent? 	
22	Why are these types of molecules solids at room temperature?	
23	What type of structure do diamond, graphite and silicon dioxide have?	
24	Why do these molecules have high melting and boiling points?	
25	Why is diamond hard?	
26	Why doesn't diamond conduct electricity?	
27	Why is graphite slippery?	
28	Why does graphite conduct electricity?	
29	Why is graphene used in electronics?	
30	Give two examples of fullerenes and give a use for each.	
31	What type of elements from metallic bonds?	
32	Why do metals usually have high melting and boiling points?	
33	Why can metals conduct heat and electricity?	
34	Why can metals be bent and shaped?	
35	Why are alloys usually harder than pure metals?	

TEST YOURSELF - Part 2b - States of Matter

No.	Question	Answer
1	Draw a diagram to show the particles in a solid.	
2	Draw a diagram to show the particles in a liquid.	
3	Draw a diagram to show the particles in a gas.	
4	Give a limitation of the particle model to show the different states of matter.	
5	What do the state symbols (s), (l), (aq) and (g) mean?	
6	Changing from a solid to liquid is called _____.	
7	Changing from a gas to a liquid is called _____.	
8	Changing from a liquid to a solid is called _____.	
9	Changing from a liquid to a gas is called _____.	
10	The melting point of bromine is -7.2 °C and its boiling point is 58.8 °C. What state will it be at room temperature (20°C)?	

TEST YOURSELF - Part 3 - Quantitative Chemistry

No.	Question	Answer
1	You calculate the relative formula mass of a substance by adding up the _____ _____ _____ of all the atoms in its formula.	
2	What is the equation to calculate percentage mass of a substance?	
3	The law of_____ _____ _____ states that the mass of the reactants is always equal to the mass of the products.	

4	This is because no atoms can be _____ or _____.	
5	If the mass of the substances in a reaction seem to increase it's usually because one of the - _____ is a gas.	
6	If the mass of the substances in a reaction seem to decrease it's usually because one of the - _____ is a gas.	
7	This is because in a gas the particles will _____ _____- to fill the container they are in.	
8	The concentration of a solution can be measured in mass per given _____ of solution.	
9	2. Concentration is calculated using this equation Concentration =	
10	The units for concentration are _____.	
11	What happens to the concentration of the solution as you add more solute?	

TEST YOURSELF - Part 4 - Chemical Changes

No.	Question	Answer
1	The pH scale runs from 0 to ____.	
2	What ions do acids produce in aqueous solutions?	
3	What ions do alkaline solutions contain?	
4	Acids have a pH of below _____.	
5	Write the equation to produce water in a neutralisation reaction.	
6	Acid + Metal hydroxide → _____ + _____	
7	Acid + Metal Oxide → _____ + _____	
8	The first part of a salts name comes from the _____.	
9	The second part of a salts name comes from the _____.	

10	Hydrochloric acid forms _____ salts.	
11	Nitric acid forms - _____ salts.	
12	Sulphuric acid forms _____salts.	
13	To make a sample of a soluble salt you mix an acid and an insoluble base. Remove the excess insoluble base using _____. To remove the soluble salt from the solution you need to use _____.	
14	The more reactive a metal is, the more easily it can form _____ _____.	
15	Metal + Acid → _____ + _____	
16	Some metals react with water to make _____ _____ and _____	
17	A more reactive metal will _____ a less reactive one.	
18	Most metals are found in the earth as compounds and need to be extracted from their _____.	
19	_____ is the gain of oxygen.	
20	_____ is the loss of oxygen.	
21	If a metal is less reactive than carbon it can be extracted by _____.	
22	If a metal is more reactive than carbon it has to be extracted by _____.	
23	An ionic compound can be broken down if an electric current is passed through it if is _____ or _____.	
24	Electrolytes are substances that contain _____ ions.	
25	What charge do metal ions have?	
26	What charge do non-metal ions have?	
27	During electrolysis the positive ions move towards the _____ electrode.	

28	When an ionic compound is electrolysed the metal forms at the _____ electrode.	
29	When an ionic compound is electrolysed the non- metal forms at the _____ electrode.	
30	Aluminium oxide is dissolved in molten _____ before it is electrolysed because it reduces the temperature it melts at.	
31	When aluminium oxide is electrolysed, what forms at the positive electrode?	
32	The gas that is produced at the positive electrode when aluminium oxide is electrolysed reacts with the carbon electrode to form _____ _____.	
33	Why can't aluminium be extracted by reduction with carbon?	
34	When water is electrolysed, what ions does it break down into?	
35	In electrolysis, the two electrodes are put into the _____.	