C3 (Higher) Key Questions that will help you get the level you deserve Learn these! Try each one. Ones you don't know try again and again Fold over 'The Answers' column and reveal having attempted the questions

Basic Principles			
	Understand that in a chemical reaction, reactants are changed into products		
	Recognise the reactants and products in a word equation		
	Construct word equations given the reactan	its and products	
	Recognise the reactants and the products in	n a symbol equation	-
1.	What are the number of elements in a		2
	compound given its formula?		Carbon
			Hydrogen
2	Eg. CD4 What are the number of stoms in this		5
Ζ.	formula?		5
	Eg. CH₄		
3.	What are the number of atoms of each		1 x Carbon
	element in this formula? Eg. CH ₄		4 x Hydrogen
4.	How can you tell whether something is an		An element has one capital letter (ie.
	element or a compound from its formula?		One element)
			A compound has multiple capital
			letters (ie. More than one element)
5.	What is a molecule?		More than one atom joined together
6.	What is an ion?		An element with a charge (either +
			or -) with an excess or fewer
7	What are the names of the 2 types of		
7.	chemical bonding?		Covalent bonding
8	What is ionic bonding?		The attraction between a positive ion
0.	What is follo bollaring :		and a negative ion
9.	What is covalent bonding?		The sharing of a pair of electrons
10.	How do you make a symbol equation		The number of atoms in reactants
	balanced?		and products either side of the
			'arrow'
11.	What is the formula of calcium carbonate?		CaCO ₃
12.	What is the formula of carbon dioxide?		CO ₂
13.	What is the formula of hydrogen?		H ₂
14.	What is the formula of water?		H ₂ O
15.	What is the formula of hydrochloric acid?		HCI
16.	What is the formula of sulfuric acid?		H ₂ SO ₄
17.	What is the formula of calcium chloride?		
18.	vvnat is the formula of magnesium		MgCl ₂
10	What is the formula of magnesium		Maso
19.	sulfate?		Wg3O4
20	How are positive ions formed?		When electrons are lost from atoms
21.	How are negative ions formed?		When electrons are gained by atoms
Rate of a reaction			
22.	Give an example of a slow reaction and a		Rusting is a slow reaction
	fast reaction		Burning and explosions are very fast
			reactions
23.	What apparatus would be useful to		A gas syringe collected the gas from
	measure the rate of reaction producing a		a flask
	gas?		
24.	Why does a reaction stop?		The number of reactants have been
07			used up to make a product.
25.	vvnat is the rate of reaction?		Inteasures how much product is
26	What are common units for the rate of		a/s or a/min
20.	reaction?		cm ³ /s or cm ³ /min
27	In terms of a limiting reactant, how much		The amount of product formed is
21.	product is formed?		directly proportional to the amount of
			limiting reactant used.
i			

28.	What is the limiting reactant?	Г	The reactant not in excess and
		ti	herefore is ALL used up at the end of the reaction
29.	What is meant by the amount of product	T	The graph is straight
	formed in a reaction is directly		Has a positive gradient
	proportional to the amount of limiting	F	Passes through the origin (0,0)
30.	Why is the amount of product formed in a	F	Reactions happen when particles
	reaction directly proportional to the	С	collide with enough energy.
	amount of limiting reactant used?	1	The more reactant particles there
		f	ormed.
31.	When does a chemical reaction take place?	V	When reactant particles collide
32.	What effect does increasing the		ncreases rate of reaction
	temperature have on the rate of a	F	Particles have more kinetic energy
	chemical reaction? why?		ncreases
		T	The amount of successful collisions
		(meeting activation energy
			nreashold) increases
			ncreases
33.	What effect does increasing the		ncreases the rate of reaction
	concentration have on the rate of a chemical reaction? Why?	l I	here are more particles so the
		 	Therefore the rate of reaction
		i	ncreases
34.	What effect does increasing the pressure		ncreases the rate of reaction
	gases?	V	which particles can move around
		Г	This therefore increases the chance
		C	of collisions and the frequency of
			Consions Therefore the rate of reaction
		i	ncreases
35.	What does the rate of reaction depend	0	Collision frequency of reacting
	on?	μ Γ	Energy transferred during the
		C	collision (whether the collision is
		s	successful or effective)
36.	What additional substance can be added to increase the rate of reaction?	ļ A	A catalyst
37.	Describe an explosion	, A	A very fast reaction which releases a
			arge volume of gaseous products
38.	How can surface area effect the rate of reaction		ncreasing the total surface area
		F	Powdered reactant rather than a
		l	ump.
			This is because there is a greater
		C	areater number of particles
39.	Describe a catalyst	Ā	A substance which changes the rate
		C	of reaction and is unchanged at the
40	Why is only a small amount of catalyst	e	and of the reaction
40.	needed	t t	he catalyst is not used up in the
		r	eaction and so can therefore
/1	Explain the dangers of fine combustible	С г	Continue to effect the reaction
41.	powders in factories eg. flour		contact with oxygen.
	· · · · · · · · · · · · · · · · · · ·	A	A spark or light is likely to cause an
		e	explosion because there are a large
	Rea	cting Masses	
42.	How do you work out the relative formula		The relative atomic masses are

43. What is the conservation of mass? The local mass of reactants at the start of a reaction is equal to the total mass of roucts made. 44. How would you work out the mass of one start of a reaction is equal to the rouce the rouce the rouce the mass of all reactants. Anown relative formula mass? Vark out the relative formula mass of all reactants. 45. What is percentage yield and atom economy A way of comparing the amount of product finance (predicted yield). The closer to 100% is best. 46. Why would the percentage of yield of a product be less than 100%? Loss in transferred liquids Not all reactants reactant to make a product be less than 100%? 47. How can atom economy be used as a way of measuing the amount of atoms wasted? The higher the product how as a target of yield of a product be less than 100%? 48. Recall use the formula of percentage yield Actual yield 48. Recall use the formula of percentage yield Actual yield 49. Explain why an industrial process wants as high a percentage yield as possible Reducing the reactant wasted Reducing the reactant wasted Reducing the reactant sease fraction of unwant difference in the product shows and the entry of the relations of the reactant sease in the second mass of a second product in the reactant have been to unke a product by 100 47. How can atom economy be used as a wasted? To reduce the product sease in the second product in the second product in the othis reactant have been to unke a product by 100		mass (Mr) calculation?		added together in the quantities that
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57. Describe differences between a batch and Batch		J/g?	or Continuous	Mass of fuel burnt (in g)
	57	Batch Describe differences between a batch and	or Continuous	Batch

	continuous process	Chemicals needed in a small amount or only as needed Production does not go on all the time Product made at the end of the process Cost of factory equipment low Rate of production low Shut-down times often Workforce – many people needed <u>Continuous</u> Large amount made Production goes on all the time Product made throughout the process Cost of factory equipment high Rate of production high Shut-down times rare Workforce – relatively few people needed
58.	List the factors that affect the cost of making and developing a pharmaceutical drug	Research and testing Labour costs Energy costs Raw materials Time taken for development
59.	Explain why pharmaceutical drugs need to be thoroughly tested before they can be licensed for use	Tested to check they are not toxic Later trialled using human volunteers Potential side effects should show themselves Most substances do not pass all the tests and trials, so drug development is expensive.
60.	Give suggestions of how speciality chemicals such as pharmaceuticals can be made.	Synthetically Extracted from plants
61.	Explain why it is important to manufacture pharmaceutical drugs to be as pure as possible	Reduces changes of unnecessary side effects and helps ensure an accurate dose in each tablet/capsule
62.	Describe how melting point, boiling point and thin layer chromatography can be used to establish the purity of a compound	Impurity lowers the melting point Impurity raises the boiling point Thin layer chromatography shows that the substance produces just one spot on a plate The distance travelled by the substance is identical to a known sample of that substance on the same plate.
63.	Describe how chemicals are extracted from plant sources	Crushing Boiling and dissolving in suitable solvent Chromatography
	Allotropes of ca	rbon and nanochemistry
64.	List the physical properties of diamond	Lustrous, colourless and clear(transparent) Hard and has a high melting point Insoluble in water Does not conduct electricity
65.	List the physical properties of graphite	Black, lustrous and opaque Slippery Insoluble in water Conducts electricity
66.	How are nanotubes used?	Reinforce graphite in tennis rackets because nanotubes are very strong

		Nanotubes are used as
~-		semiconductors in electrical circuits
67.	Explain, in terms of structure and	Giant molecular structure
	bonding, why diamond.	Each carbon atom is covalently bonded to four other carbon
	Does not conduct electricity	atoms
	Is hard and has a high melting point	A lot of energy is needed to
	с с.	separate the atoms in diamond.
		 Covalent bonds are strong, and
		diamond contains very many
		covalent bonds.
		There are no free electrons or
		ions in diamond, so it does not
69	Evoloin in terms of structure and	Conduct electricity.
00.	bonding why graphite:	Giant molecular structure Covalent bonds very strong a
	bonding, why graphice.	 Covalent bolius very strong – a lot of energy needed to separate
	Conducts electricity	atoms
	Is slippery	Each carbon is only covalently
	Has a high melting point	bonded to 3 other carbon atoms
		Graphite is therefore in layers
		Layers slide over each other
		easily because there are only
		weak forces between them.
		Graphite contains delocalised
		around allowing graphite to
		conduct electricity.
69.	Explain why fullerenes can be used in	They are very strong.
	new drug delivery systems	The Buckminsterfullerene is
		spherical and contains 60 carbon
		atoms. Drugs can be contained
70	Fundain have the atmost on a finance to be a	within these.
70.	Explain now the structure of hanotubes	Have very large surface area.
71	What is an allotrone?	Forms of an element that exist in the
/ I.		same state (eq. Solid or liquid) but
		have different properties because
		their atoms are arranged differently.
72.	What does nano mean?	Very small – 1 billionth of a metre.