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| Topic heading | Syllabus Ref | Idea cluster | Question 1 | Question 2 | Question 3 | Question 4 |
| Chemical changes  | GCSE CCh(1) | Reactivity of metals and their oxides | What happens when metal oxides are formed?1. Metals transfer electrons to the oxygen.
2. Oxygen transfers electrons to metals.
3. Metals and oxygen share electrons.
4. Metals and oxygen both donate electrons to a free moving sea of electrons.
 | Why are some metals more reactive than others?1. They accept electrons more easily.
2. They accept protons more easily.
3. They donate their outer shell electrons more easily
4. They donate their inner shell electrons more easily.
 | Which of the following statements is true about the reaction between metals and oxygen?1. The metal and oxygen are reduced.
2. The metal is oxidised and oxygen is reduced.
3. The metal and oxygen are oxidised.
4. The metal is reduced and oxygen is oxidised.
 | Which of the following is the correct formula for magnesium oxide?1. MgO2
2. Mg2O
3. Mg2O2
4. MgO
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|  |  |  | A | C | B | D |
|  | GCSE CCh(2) | The reactivity series | What is true of metals that are higher in the reactivity series?1. They form oxides more easily.
2. Their oxides are more easily reduced.
3. They don’t corrode very easily.
4. They are poor electrical conductors.
 | Which of the following reactions could occur?1. Mg + 2NaCl 🡪 MgCl2 + 2Na
2. Mg + CuO 🡪 MgO + Cu
3. FeCl2 + Cu 🡪 Fe + CuCl2
4. Fe + MgCl2 🡪 FeCl2 + Mg
 | What is observed when a metal reacts with hydrochloric acid?1. The metal dissolves giving a blue solution.
2. The metal fizzes giving off carbon dioxide.
3. The metal fizzes giving off hydrogen.
4. The metal dissolves giving an acidic solution.
 | Lumps of magnesium are sometimes attached the bottoms of steel ships. What is the purpose of this?1. Magnesium is softer than iron and acts like a bumper
2. Iron is more reactive than magnesium and so the magnesium corrodes instead of the iron.
3. Iron is less reactive than magnesium and so the iron corrodes instead of the magnesium.
4. Magnesium is more reactive than iron and so corrodes instead of the iron.
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|  |  |  | A | B | C | D |
|  | GCSE CCh(3) | Extraction of metals and reduction | Pick the ionic equation for the reduction of copper and oxidation of another metal.1. Cu + Zn2+ 🡪Cu2+ + Zn
2. Zn + Cu2+ 🡪Zn2+ + Cu
3. Cu🡪 Cu2+ + 2e-
4. Cu2+ + 2e-🡪 Cu
 | How can carbon used to extract iron from iron oxide in the blast furnace?1. Carbon is a better reducing agent than iron.
2. Iron is more reactive than carbon.
3. Carbon is less reactive than iron.
4. Carbon is a good oxidising agent.
 | Gold is found in the ground as an element but zinc is always found in rocks as a compound. Which statement below ***best*** explains why this is?1. Gold is more reactive than zinc.
2. Gold is higher in the reactivity series than zinc.
3. Zinc is more reactive than gold.
4. Zinc is more reactive than gold and gold has an extremely low reactivity.
 | When Zn is added to blue CuSO4 solution a brown precipitate is observed and the blue colour fades.The same thing is observed when Mg is added to the blue CuSO4 solution.What can be said about the reactivity of the three metals Mg, Zn and Cu from this evidence alone?1. Mg is more reactive than Zn which is more reactive than Cu.
2. Cu is more reactive than the other two metals
3. Cu is less reactive than the other two metals.
4. Zn is more reactive than Mg which is more reactive than Cu.
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|  |  |  | B | A | D | C |
|  | GCSE CCh(4) | Reactions of acids | What salt forms when magnesium reacts with nitric acid?1. Magnesium chloride
2. Magnesium sulphate
3. Magnesium nitrate
4. Magnesium nitric
 | What is the formula of the salt formed when sodium carbonate reacts with hydrochloric acid?1. NaCl2
2. NaCl
3. 2Na2Cl
4. Na2Cl
 | Choose the correct balanced equation for a neutralisation reaction.1. H+ + OH- 🡪 H2O
2. 2H+ + OH🡪 H2O
3. H + OH 🡪 H2O
4. H+ + OH- 🡪 2 H2O
 | What is the formula of the salt formed when sodium hydroxide reacts with sulfuric acid?1. NaSO4
2. Na2SO4
3. Na2(SO4)2
4. Na(SO4) 2
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|  |  |  | C | B | A | B |
|  | GCSE CCh(5) | Electrolysis | In electrolysis, what is the name of the negative electrode?1. Anode
2. Electrolyte
3. Electrolysis
4. Cathode
 | During electrolysis, why does the electrolyte need to be molten or a solution?1. The ions need to be able to move through it.
2. The electrons need to be able to move through it.
3. The protons need to be able to move through it.
4. The atoms need to be able to move through it.
 | During the electrolysis of aluminium oxide to extract aluminium the carbon positive electrode must be regularly replaced. Why is this? 1. Carbon reacts with the metal ions at the anode making CO2.
2. Carbon reacts with the metal ions at the cathode making CO2.
3. Oxygen reacts with the carbon anode making CO2.
4. Oxygen reacts with the carbon cathode making CO2.
 | Explain why copper discharges at the cathode instead of hydrogen in the electrolysis of copper sulphate solution.1. Copper is less reactive than hydrogen
2. Copper is more reactive than hydrogen
3. Copper is more reactive than sulphur
4. Copper is less reactive than sulphur.
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|  |  |  | D | A | C | A |
| The rate of reaction | GCSE CRa(1) | Rate of reaction | What happens to the rate of reaction when the temperature is increased?1. The particles move slower and the rate increases
2. The particles have more kinetic energy and the rate decreases
3. The particles have more kinetic energy and the rate increases
4. The collisions are more energetic and the rate decreases
 | How does a catalyst increase the rate of reaction?1. They allow reactants to mix better.
2. They lower the activation energy.
3. They give particles more kinetic energy.
4. They increase the activation energy.
 | How and why does breaking up a solid affect the rate of reaction?1. It increases the surface area to volume ratio thus increasing the frequency of collisions.
2. It decreases the surface area to volume ratio thus increasing the frequency of collisions.
3. It decreases the number of particles and so there is less to react.
4. It adds energy making collisions more likely to lead to a reaction.
 | What does this piece of equipment measure?1. Turbidity
2. Temperature
3. Volume of gas
4. Volume of acid
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|  |  |  | C | B | A | C |
|  |  |  | Magnesium ribbon was reacted with 1M hydrochloric acid. The volume of gas produced was measured every few seconds and a graph of gas volume against time was plotted.If the reaction was left to finish what would the graph look like?TimeVolume of gas producedABCD | Magnesium ribbon was reacted with 1M hydrochloric acid; the reaction stopped because all the Mg had reacted. The volume of gas produced was measured every few seconds and a graph of gas volume against time was plotted and the graph is shown belowThe reaction was repeated using the same volume of 2M acid. How would the graph be different from the one above? TimeVolume of gas produced1. The graph would be steeper and level off at a higher gas volume.
2. The graph would be steeper and level off at a lower gas volume.
3. The graph would be steeper and level off at the same gas volume.
4. The graph would be less steep and level off at the same gas volume.
 | Zinc reacts with hydrochloric acid according the equation:Zn(s) + 2HCl (aq) 🡪 ZnCl2(aq) + H2(g)The reaction is exothermic.A student wanted to study the rate of reaction by measuring how a variable changed every 10 seconds. Which variable would not be appropriate to measure every 10 seconds?1. Temperature
2. pH
3. The volume of gas produced
4. The volume of the liquid
 | Hydrogen peroxide slowly decomposes producing water and oxygen gas. What impact would adding a catalyst have on this reaction?1. It would speed up the reaction but not change the amount of oxygen produced.
2. It would speed up the reaction and increase the amount of oxygen produced.
3. It would speed up the reaction and decrease the amount of oxygen produced.
4. The reaction would not change speed but more oxygen would be produced.
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|  |  |  | B | C | D | A |
|  | GCSE CRa(2) | Reversible reactions and dynamic equilibrium | What is a reversible reaction?1. A reaction where all reactants turn into products.
2. A reaction where reactants can turn into products and products can turn into reactants
3. A reaction where no reactants turn into products.
4. A reaction that stops before all reactants have turned into products.
 | Which statement is true about dynamic equilibrium reactions?1. There are equal amounts of reactants and products in the equilibrium mixture.
2. The equilibrium mixture contains more reactants than products.
3. The forward and reverse reactions occur at exactly the same rate.
4. If the reverse reaction is exothermic then the forward reaction is always exothermic
 | For a reaction where the forward reaction is exothermic what conditions would shift the position of equilibrium to the products?1. A catalyst
2. Decrease in temperature
3. Increase in temperature
4. High pressure
 | What would happen to the equilibrium mixture if the reaction below were pressurised?N2(g) + O2(g) ⇔ NO2(g)1. Equilibrium would not be reached
2. Equilibrium shifts towards the reactants
3. Equilibrium is not affected
4. Equilibrium shifts towards the products
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|  |  |  | B | C | B | D |
|  | GCSE CRa(2) | Reversible reactions and dynamic equilibrium | What does Le Chatelier’s principle allow scientists to do?1. Predict how fast a reaction will be.
2. Predict if a reaction will occur.
3. Predict the effect of changing a reaction at equilibrium.
4. Predict how much product will be produced.
 | Ammonia is made industrially in the Haber Process. What is the correct equation for this reaction?1. N + H3 🡪 NH3
2. N2 + H2 🡪 2NH
3. N2 + 3H2 🡪 NH3
4. N2 + 3H2 🡪 2NH3
 | Ammonia is made industrially in the Haber Process. The equation for this exothermic reaction is:N2(g) + 3H2(g) ⇔ 2NH3(g)What conditions will lead to the greatest concentration of ammonia being present at equilibrium?1. High pressure and low temperature.
2. High pressure and high temperature.
3. Low pressure and low temperature.
4. Low pressure and high temperature.
 | Ammonia is made industrially in the Haber Process. The equation for this exothermic reaction is:N2(g) + 3H2(g) ⇔ 2NH3(g)What would the effect of heating this experiment be?1. It would reach equilibrium faster and more ammonia would be present in the mixture.
2. It would reach equilibrium faster and less ammonia would be present in the mixture.
3. It would reach equilibrium slower and more ammonia would be present in the mixture.
4. It would reach equilibrium slower and less ammonia would be present in the mixture.
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