

# End Of Year Exam Revision

## Redox Reactions

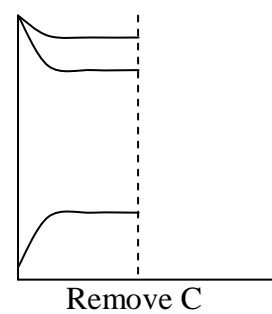
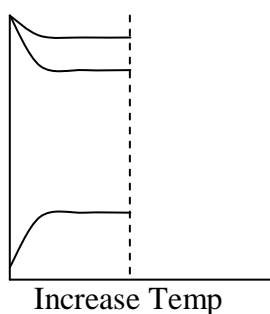
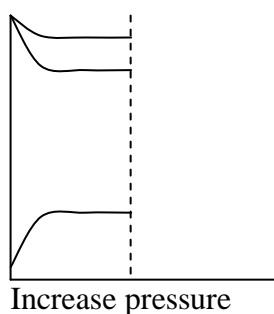
1. Name two common processes that are considered to be redox reactions
2. Define oxidation and reduction in terms of oxygen, hydrogen, electrons and oxidation number.
3. Calculate the oxidation numbers of the underlined atoms.  
a)  $\underline{\text{N}}\text{H}_3$                       b)  $\text{H}_2\underline{\text{S}}\text{O}_4$                       c)  $\text{H}\underline{\text{C}}\text{N}$                       d)  $\text{Ca}_3(\underline{\text{P}}\text{O}_4)_2$
4. State which of the following reactions are redox giving clear reasons for your choice.  
a)  $2\text{Cu}_{(\text{s})} + \text{O}_{2(\text{g})} \longrightarrow 2\text{CuO}_{(\text{s})}$   
b)  $2\text{KOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$   
c)  $\text{HCl} + \text{NaHCO}_3 \longrightarrow \text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$
5. Balance the following redox reactions by first balancing the half reactions then balancing the overall reaction. For each half-reaction also state which one is oxidation and which is reduction.  
a)  $\text{Cu}_{(\text{s})} \longrightarrow \text{Cu}^{2+}_{(\text{aq})}$   
 $\text{O}_{2(\text{g})} \longrightarrow \text{H}_2\text{O}_{(\text{l})}$   
b)  $\text{SO}_4^{2-}_{(\text{aq})} \longrightarrow \text{SO}_{2(\text{g})}$   
 $\text{Cd}_{(\text{s})} \longrightarrow \text{Cd}^{2+}_{(\text{aq})}$   
c)  $\text{Cr}^{3+}_{(\text{aq})} \longrightarrow \text{Cr}_2\text{O}_7^{2-}_{(\text{aq})}$   
 $\text{MnO}_4^{-}_{(\text{aq})} \longrightarrow \text{Mn}^{2+}_{(\text{aq})}$
6. Using your list of standard reduction potentials find the cell voltage if each of these was made into galvanic cells.

# Electrochemistry

1. Explain the difference between galvanic and electrolytic cells.
2. Explain what is meant by the term non-spontaneous redox reactions.
3. Explain the difference between primary and secondary galvanic cells.
4. Explain the difference between cells and batteries.
5. Explain the purpose of the salt bridge and electrodes.
6. Draw and label a diagram of a zinc-magnesium cell showing the following information.
  - a) Composition of the electrodes and electrolyte.
  - b) anode and cathode (and their sign)
  - c) direction of ion flow in the salt bridge
  - d) direction of electron flow
  - e) Half reactions for each half cell and the overall cell equation.
  - f) calculation of the cell voltage
  - g) cell notation
7. Explain your choice of the cathode for the cell above in as much detail as possible.
8. In the cell in question 6 which electrode is corroded in the process.
9. Explain the term spectator ions.
10. Explain how a rechargeable battery works.
11. Explain why an aqueous electrolyte cannot be used for the electrolytic production of active metals such as potassium and sodium.
12. What are the advantages of using an aqueous electrolyte over a molten one.
13. Draw and label an electrolytic cell showing how you would plate a bumper bar with chromium including:
  - a) Composition of the electrodes and electrolyte.
  - b) anode and cathode (and their sign)
  - c) Half reactions for the process.
14. Draw and label an electrolytic cell showing how you would purify an impure sample of copper (include half reactions)

# Industrial Chemistry

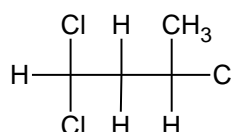
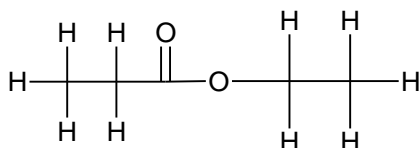
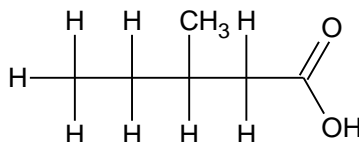
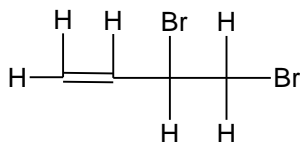
1. Define energy.
2. Name five types of energy.
3. Find the energy released if 250 mL of ethanol is used to heat 5 L of water by 28°C.
4. If another 250 mL of ethanol is burned, calculate the temperature rise of 7.3 L of water.
5. Explain the reaction mechanism in terms of energy transfer.
6. Name the type of reaction which absorbs heat energy.
7. Draw and label an energy profile diagram for the type of energy in question 6 above.
8. Define the term activation energy.
9. State collision theory.
10. State the factors which influence rate of reaction and briefly describe how each relates to collision theory.
11. What are enzymes? Explain why there are almost as many enzymes in the body as there are chemical reactions.
12. Define the term dynamic equilibrium.
13. Define what is meant by a closed system in relation to equilibrium.
14. Show how the equilibrium will shift in the given circumstances



15. State five factors to consider when looking to build a chemical plant and briefly describe why each is important

# Organic Chemistry

1. Give two reasons why there are so many organic compounds.
2. Define the term homologous series.
3. Name the following

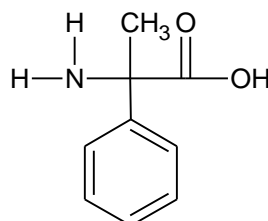
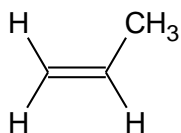


4. Draw the following
  - a) 1,2,3,4-tetrafluoro butane
  - b) 3-methyl 2-pentanol
  - c) methyl butanoate
  - d) 3,3-dibromo 1-propyne
5. Explain why alkanes are relatively unreactive.
6. Write the reaction for the complete combustion of butane.
7. Define the term unsaturated hydrocarbon.
8. Explain why twice as much bromine is needed for a consistent colour change in alkynes than is required for alkenes.
9. Explain why ethane is a gas at room temperature but ethanol is a liquid.
10. Complete the following stating the expected colour change

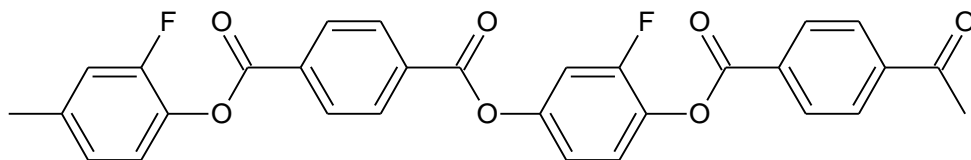
	With Bromine Water	With Acidified Dichromate
Alkanes		
Alkenes		
Alkynes		
Alcohols		
Carboxylic Acids		
Esters		

11. State the two ways of producing ethanol and write an equation for each.
12. Explain why carboxylic acids are weak electrolytes.
13. What two organic substances are needed to make esters? What is the other product?

14. There are some natural fibres such as wool, but a lot are synthetic. Explain the term synthetic and name a synthetic fibre.
15. Why are natural fibres better to wear in hot weather?
16. Name the 4 broad types of polymers and briefly describe each
17. Name the two types of condensation polymers and draw the linking unit in each.
18. Draw the polymers that can be formed from the following monomers.



19. Draw the monomer(s) that were used to form the following polymer.



20. Define the term plastic. State two advantages of plastics over traditional materials such as wood and metal.
21. Explain why thermoset plastics are generally not recyclable.
22. State two disadvantages of using plastics instead of wood products.

## Extended Response Questions

1. With reference to the reaction mechanism and collision theory explain what exothermic and endothermic reactions are and how they work. Use energy profile diagrams and/or diagrams to help explain your answer.
2. The Haber Process for the production of ammonia is shown in the equation below. It is an equilibrium process that occurs commonly in many industrial processes. State the factors needed to establish an equilibrium and state conditions in terms of pressure and temperature that would maximise the amount of ammonia produced. State also reasons why these conditions may not be used. Ensure you give full reasoning with your choices.



3. Sulfuric acid is produced on a large scale at Port Adelaide in South Australia using the contact process. The factory is situated in an industrial area near the Port River, and separated from residential areas by approximately the width of the river. One of the first steps in the production of sulfuric acid is the burning of sulphur to produce sulphur dioxide. The sulphur is imported from America. Discuss the advantages and disadvantages of this site for the factory.
4. Polymers are widely regarded as one of the most important discoveries ever made in chemistry. Discuss the advantages and disadvantages of polymers.