



Subject/Topic:

Date:

1a) Nitric acid

b) Potassium manganate (VII)

c) Calcium hydroxide

d) Ammonia

e) Bromine

2a) Each successive member differs by a $-CH_2-$ group
They have the same functional group

b) Alkane C_nH_{2n+2} Propane $\begin{array}{c} H & H & H \\ | & | & | \\ H-C & -C & -C-H \\ | & | & | \\ H & H & H \end{array}$

Alkane C_nH_{2n} Ethene $\begin{array}{c} H & H \\ | & | \\ C & =C \\ | & | \\ H & H \end{array}$

alcohol $C_nH_{2n+1}OH$ methanol $\begin{array}{c} H \\ | \\ H-C-OH \\ | \\ H \end{array}$

3a) 78%

b) $N_2 + O_2 \rightarrow 2NO$

c) Carbon monoxide is formed due to incomplete combustion of carbon containing fuels in the presence of a limited supply of oxygen

i) Carbon monoxide binds with haemoglobin which prevents the ability of oxygen to bind with haemoglobin and be transported across the body, leading to oxygen deprivation

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4) amphoteric oxides
neutral oxides
acidic oxides

5a) An alloy is a mixture of elements where at least one of the elements is a metal.

b) 1. Using a 10cm³ measuring cylinder, measure 2cm³ of ^{dilute} hydrochloric acid and transfer into a test tube and seal the test tube by using a stopper. Prepare 3 of such identical test tubes and leave to rest till complete evaporation

2. Using an electronic balance, weigh 1g of each of the metals iron, chromium and nickel and transfer each metal into the respective test tubes of acidic air prepared.

3. Leave the test tubes to rest for 2 hours

4. After 2 hours, weigh each of the respective metals ^{left} using an electronic balance and record the final masses

5. The metal that has the greatest decrease in mass is the metal that has the greatest rate of corrosion in moist acidic air.

c) Adding a layer of paint over the iron. The layer of paint acts as a barrier to prevent oxygen and water from coming into contact with iron, preventing rusting.

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b)
$$\text{no. of mol of NaI} = \frac{50}{1000} \times 0.1$$
$$= 0.005 \text{ mol}$$

ii) mole ratio of NaI: PbI₂
2:1

$$\text{no. of mol of PbI}_2 \text{ produced} = \frac{0.005}{2}$$
$$= 0.0025 \text{ mol}$$

iii)
$$\text{mass of PbI}_2 \text{ produced} = 0.0025 \times (207 + 127 \times 2)$$
$$= 1.1525 \text{ g}$$

9a) Black, solid

b) Fluorine

c) At₂

d) 85

e) Chlorine is in period 3 as an atom of chlorine has a total of 3 electron shells where the first ^{electron} shell has 2 electrons, second ^{electron} shell has 8 electrons and third electron shell has 7 electrons.

f) At room temperature, chlorine molecules are far apart where they move in high speeds in random directions.

9i) Potassium chloride and aqueous iodine

ii) Colourless solutions turns brown.

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d) 1. Metals such as iron are a finite resource and should be recycled to conserve these natural resources.

2. It helps to reduce the amount of metal waste produced, thus reducing the amount of land required to store such waste metals.

e) Limestone is added to produce calcium oxide which reacts with the acidic impurities such as silicon dioxide

Carbon monoxide acts as the reducing agent to reduce iron(III) oxide into iron.

6a) Hydrocarbons are compounds that only contain hydrogen and carbon atoms.

b) Difference in boiling points

c) Bitumen

1 a) R: Zinc

S: Zinc Sulfate

T: Hydrogen gas

U: Zinc hydroxide

V: Water

b) $\text{Zn (s)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{O (l)}$

8c) Filtration.

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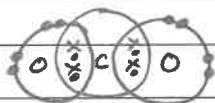
Date:

10a) The number 12 represents the total number of neutrons and protons in this isotope of carbon while the number 6 represents the number of protons in this isotope of carbon

ii) Both isotopes have the same number of protons and electrons but $^{13}_7\text{C}$ has 1 more neutron compared to $^{12}_6\text{C}$

b) K_2C_2

ci)



Legend:

x represent electron of C
o represent electron of O

ii) Carbon dioxide is a simple covalent compound that has no free mobile ions or electrons to act as charge carriers to conduct electricity

iii) Low melting and boiling point.

iv) no. of mol of C = $\frac{240}{12}$
= 20 mol

mole ratio of C:CO₂
1:1

no. of mol of CO₂ = 20 mol

Volume of CO₂ = 20 × 24
= 480 dm³

11a) Increasing the concentration of sulfuric acid used increases the speed of reaction, reducing the reaction time

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(i) 10 seconds

(ii) An increase in temperature increases the kinetic energy of the particles, increasing the number of collisions. More particles also have energy equal to or greater than activation energy, thus increasing the frequency of effective collisions, increasing the speed of reaction.

The use of magnesium powder also increases the surface area for reacting particles, leading to an increase in the number of collisions, thus increasing the frequency of effective collisions, increasing the speed of reaction.

Therefore, both changes in temperature and particle size used result in a decrease in reaction time.

(b) Exothermic reaction

(i) Mg is oxidised to Mg^{2+} where there is an increase in oxidation state from 0 in Mg to +2 in Mg^{2+}

H^+ is reduced to H_2 where there is a decrease in oxidation state from +1 in H^+ to 0 in H_2 .

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