FORM FOUR TERM ONE EXAM 2017

CHEMISTRY PAPER 1
MARKING SCHEME

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CHEMISTRY 1
MARKING SCHEME

1(a) Is the process for the separation of a mixture of solutes by their different rates of movement over a porous medium caused by moving solvent √1

b) Separation of dyes any 2 correct)

analyse and identify mixtures of substances which are difficult to separate by other means

__ Used to analyse dyes in food colour

2a) Hydrogen sulphide reduces concentrated sulphuric(vi) acid to water

Accept $H_2SO_4 + 3\ H_2S_g \rightarrow 4\ S_{(s)} + 4H_2O$ √1

b) Anhydrous calcium (ii) chloride // fused $CaCl2_4$

3a)i $PbO_{(s)} + 2\ HNO_{3\ (aq)} \rightarrow Pb\ (NO_{3(2aq)} + H_2O_{(l)}$

ii) $PbO + 2\ NaOH_{\ (aq)} \rightarrow Na_2PbO_{2(aq)} + H_2O_{\ (1)}$

b) Amphoteric

4a) Zinc is re reactive than iron an4it will lose electrons instead of iron during rusting. Tin is less reactive than iron and hence it will not protect iron once exposed to the factor causing rusting

b) E1ectroplating, Galvanizing, Oil/greasing, painting

5a) Q and P√1

c) Covalent √1

6a) Isotopes; Atoms of the same element with the same atomic number (number of protons) but different mass number due to different number of neutrons

(b) Allotropes; Different forms of an element but in the same physical state

c) Isomers; these are compounds same molecular formula but different structural formula

7(a) Fractional distillation

(b) Petrol, Kerosene, Diesel, Lubricating oil

(c) Burning the above constituents produces carbon(iv) oxide which is acidic when dissolves in water, it forms acidic solution which lowers the PH of water√1

8) No effervescence√1 In methylbenzene, hydrogen chloride remains as a covalent√1 molecules/ /No H+ formed ,

9a) The volume of a given mass of a gas is directly proportional to its absolute temperature at constant pressure

(b) V1/T1=V2/T2

V1=510cc

T1= 17+273=290k

V2=420cc

T2=?

510/290=420/T2 1 for correct substitution

$T2 \times 510 = \frac{290 \times 420}{510}$

=238.8k or -34.2^oC

10(a) A yellow solid is formed √1

b) $Cl_{2(aq)} + H_2S_{(g)} \rightarrow S_s + 2\ HC1_{\ (aq)}$

c) Carried out in a fume chamber/in the open because the two gases are poisonous

11 .Use a magnet to remove iron filings

Heat the remaining mixture NH_4C1 sublimes and is collected as a sublimate.

Common salt remains as a residue√1

12 Add distilled water to $ZnC1_2$ solid and shake until all solid dissolves

Add K2CO3// Na2CO3 solution for form white ppt of ZnCO3(g)

Filter and wash the residue with a lot of water

13 White ppt forms and dissolves forming a clear solution the white ppt is due to formation of $CaCO_3$ which is insoluble and dissolves into a clear/ colourless solution due to the soluble $Ca(HCO_3)$ formed√1

$CO_{2(g)} + Ca(OH)_{2(aq)}\ CaO_3 + H_2O_{(l)}$

$CaCO_{(3)(s)} + H_2O_{(l)} + CO_{2(g)}\ Ca(HCO_3)_{2(aq)}$

White ppt Colourless soln)

14i) At 100°C l00g water ⟶ 48Y

190g water ⟶ $\frac{48x\ 190}{100}$

ii) In 150g of saturated solution at 100°C mass of Y = 50g

At 60°C mass of Y in solution = 4Og

Mass that crystallizes = 50—40 = l0g

Attemp to subtract

15i) –Equation shifts to the right for more $CaCO_3$ to decompose to replace the CO_2 absorbed by the NaOH √1

ii) Equation-shift to the right as the forward reaction is endothermic hence favoured by high temp

16 Hard water deposits the insoluble Mg_2 and Ca_2 carbonate on the pipes preventing lead from dissolving into the water. Lead dissolves in the soft water leading to lead poisoning

17i) (32 x 8)= 256√1

ii) Plastic sulphur

iii) the rings are broken to form long chains which entangle with one another making liquid viscous

18 Mass of carbon $\frac{11\ x12}{44}$

Mass of hydrogen $\frac{4.5}{18}$ x 2= 0.5 √1

C	H
3/12=	=0.5/1
0.25	0.5
0.25/0.25=1	0.5/0.5=2

(CH2)n=84

12n+2n=84 √ ½

14n=84

14

N=6

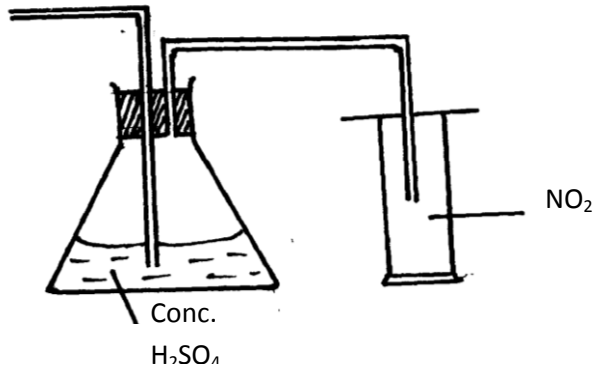
M.F=(CH2)6=C_6H_{12}√ ½

19.

Drying agent √1

Mode of collection√1

Workability √1



20 Melting point of strontium is lower than that of calcium√1
In metals are held by forces of attraction between positive nuclei and delocalized electrons. As the atomic radius increases, this attraction decreases because of the delocalized electrons increasing distance from the positive nucleus to the delocolized electrons

21a) 1

b) Increases the rate of the reaction by increasing the number of molecules with activation energy

c) Carbon(iv) oxide produced escapes into the atmosphere

22. $\frac{\text{Time } CO_2}{TNO_2} = \sqrt{\frac{\text{M.M } CO_2}{MMNO_2}}$

Where 100cm3 of CO2 takes 30 seconds

150cm3 of CO2 takes 30/100x150

=45 seconds

$\frac{TCO_2}{TNO_2} = \sqrt{\frac{M.MCO_2}{M.M\ NO_2}}$

$\frac{45}{TNO_2} = \sqrt{\frac{44}{46}}$

$TNO_2 = \frac{45 \times 46}{44}$

TNO2=46 seconds

OR

√

$\frac{RCO2}{RNO2} = \frac{M.M\ NO2}{M.M\ CO2}$

But $RCO_2 = \frac{100cm^3}{30S} = 3.333/sec$

$3.33 = \sqrt{\frac{46}{44}}$

$RNO2 = \frac{3.33}{1.0225} = 3.263/sec$

Time for $NO_2 = 150cm^3/sec$

3.26cm3 ⟶ 1sec

150cm3 ⟶ $\frac{1x150}{3.2} = 46.01sec$

Time for $NO2 = 150cm^3$

3.26cm3 1 sec /‘

150cm3 , 1 x 150 46.0 secs

23(i)

Mobile/ free delocalized eiectrons√1

Mobile/free ions√1

Mobile/free ions√1

24. The oxide ion has 2 extra electrons that cause greater electron repulsion than in oxygen atom

25 SiOC2 has a giant atomic structure with strong covalent bond holding the atoms together. These require a lot of energy to break, hence it has a higher melting point. CO_2 has simple molecular structure with weak van der waals forces require little energy to break hence sublimes at low temperature and is a gas at room temperature and pressure.

26.(i) Propene // prop-1-ene

(ii) 1,2-dichloroethane

(iii) Presence of U.V light (Ultra violet light) sunlight

27. P1atinum-rhodium/ platinum

b) $4NH_{3(g)} + 5O_{2(g)}\ 4NO_{(g)} + 6\ H2O_{(g)}$

c) As a fertilizer

Preparation of N_2O√1

Making explosives

28a) Proton donor/ electron acceptor /substance which when dissolved in water dissociates/ break to hydrogen ions as the only positive ion

b)Water/H_2O

c) It is a proton donor/electron acceptor