Penciltutor

5076&5077/03 Science(Chemistry) 2021

1)
a) Magnesium oxide/Calcium oxide
b) Carbon monoxide/water
c) Carbon dioxide/nitrogen dioxide/sulfur dioxide
d) Carbon monoxide
e) *Removed CLT
f) Calcium oxide

2)
a) 30 (or basically anything lower than 39 but higher than room temperature)
b) In the table, we can see that there is a consistent decreasing trend in melting point, from 180 degrees in lithium to 39 degrees in rubidium.
However, for density, while the overall trend is an increasing one, there is an exception in sodium as it has a higher density than potassium, which is lower in the group.
c) Soft/Yellow/Can conduct electricity
d)   i) It has three electron shells.
        ii) $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(aq)$

3)
a) 9 atoms
b) *Removed CLT
c) *Removed CLT
d) *Removed CLT

4)

Description	Type of Reaction
Reaction of halogens with other halide ions	Displacement
A compound breaking down into simpler substances	Decomposition
Acid reacting with Base	Neutralisation
Takes in energy, often in the form of heat, from the surroundings	Endothermic
Two solutions react to form an insoluble solid	Precipitation
The oxidation state of an element increases	Oxidation

5)
a) Sulfuric Acid
b) To ensure that all acid is reacted.
c) To speed up the rate of reaction.
d) Filtration
e) Evaporation

PENCILTUTOR SCHOOL (PTE) LTD.
Co. Reg. No. 200601708E
Blk 102, #02-135
Yishun Avenue 5
Singapore 760102

Penciltutor®

6)
a) The melting point is over a range of temperatures.
b) Movement: Changes from vibrating in fixed positions to sliding over one another.
Arrangement: Changes from tightly and orderly arranged to loosely and disorderly arranged.
c) To prevent any impurities that would affect the effectiveness of the drug.

7)
a)
R: Water
S: Barium Nitrate
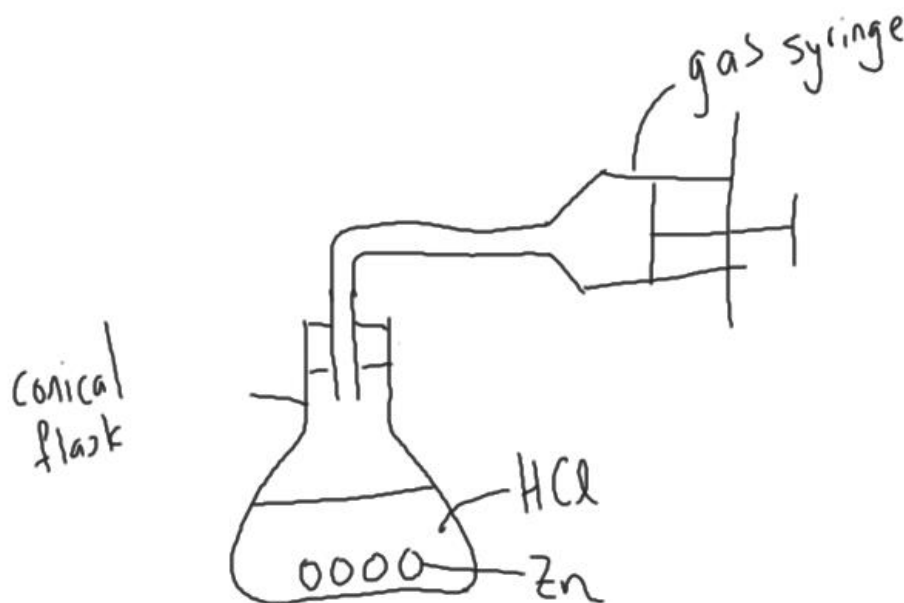T: Carbon Dioxide
U: Barium Sulphate
V: Ammonia Gas

b)
$BaCO_3 + 2HNO_3 \rightarrow Ba(NO_3)_2 + CO_2 + H_2O$
OR
$Ba(NO_3)_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaNO_3$
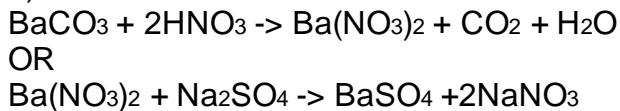
8)
a)
amt of $TiCl_4$ = mass/Mr
= 9.50 / (48 + 35.5 x 4)
= 0.05 mol

Amt of Ti = 0.05mol

Mass of Ti   = amt x Mr
= 0.05 x 48 = 2.4g

b) An alloy occurs when a metal is mixed with other elements.

c) Stainless Steel / Steel/ Brass

PENCILTUTOR SCHOOL (PTE) LTD.
Co. Reg. No. 200601708E
Blk 102, #02-135
Yishun Avenue 5
Singapore 760102

Penciltutor®

9)
a)   i) 270seconds
      ii)

iii) Ensure curve X has steeper slope but ends at the same maximum volume.
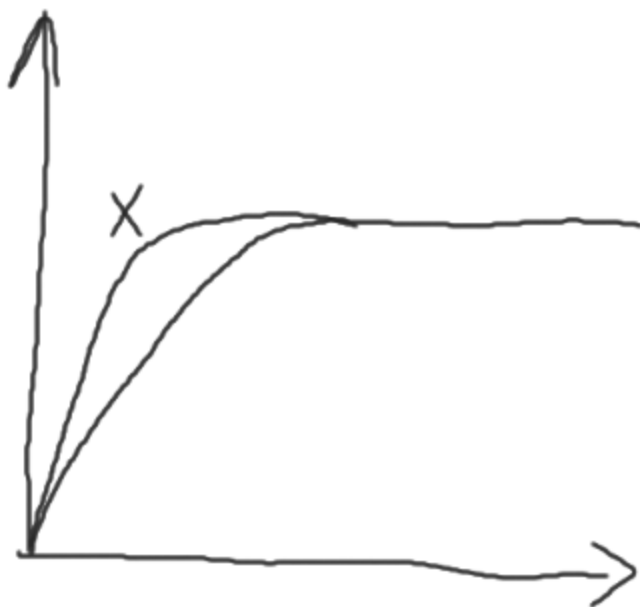
iv) When concentration decreases, the number of particles per unit volume decreases. Particles are futher apart and frequency of effective collisions decreases. Thus rate of reaction decreases

PENCILTUTOR SCHOOL (PTE) LTD.
Co. Reg. No. 200601708E
Blk 102, #02-135
Yishun Avenue 5
Singapore 760102

Penciltutor®

b) i) amt of HCl = conc x vol
                    = 0.4 x 50/1000
                    = 0.02 mol

    ii) amt of H_2 = 1/2 x 0.02
                       = 0.01 mol

    iii) vol of H_2 gas = amt x $24dm^3$
                           = 0.01 x 24
                           = $0.24dm^3$

10) * Removed CLT

11)
a) i)

Particle	Relative Mass	Relative Charge
Electron	1/1840	1- (-1 or – will be incorrect as they provided a pattern to follow from proton)
Proton	1	1+
Neutron	1	0

    ii) Electrons: 35
         Protons: 35
         Neutrons: 44

    iii) nucleons in Ca = 40
          Nucleons in isotope = 40 x 2 = 80
          Neutrons in isotope = 80 – 35 = 45

b) i) Electronic configuration of Potassium is 2,8,8,1. It has one electron in its valence shell which it loses to form potassium ion K+ to obtain a stable octet structure.

    ii) High melting/boiling point
         Able to conduct electricity in the molten and aqueous form
         Soluble in water
         Choose any two.