233/1
CHEMISTRY
JULY, 2018
PAPER 1
Marking scheme

BUURI EAST STANDARDS

Kenya Certificate of Secondary Education
CHEMISTRY 233/1

1. a) burette

   b) Measuring accurate volumes

2. a) Generate steam that pushes out the air

   b) Magnesium would react with air hence no gas would be formed.

3. $SO_2 = 64$ √½ $CO_2 = 44$ √½

   $\frac{TCO_2}{TSO_2} = \sqrt{\frac{RMM\ CO_2}{RMM\ SO_2}}$

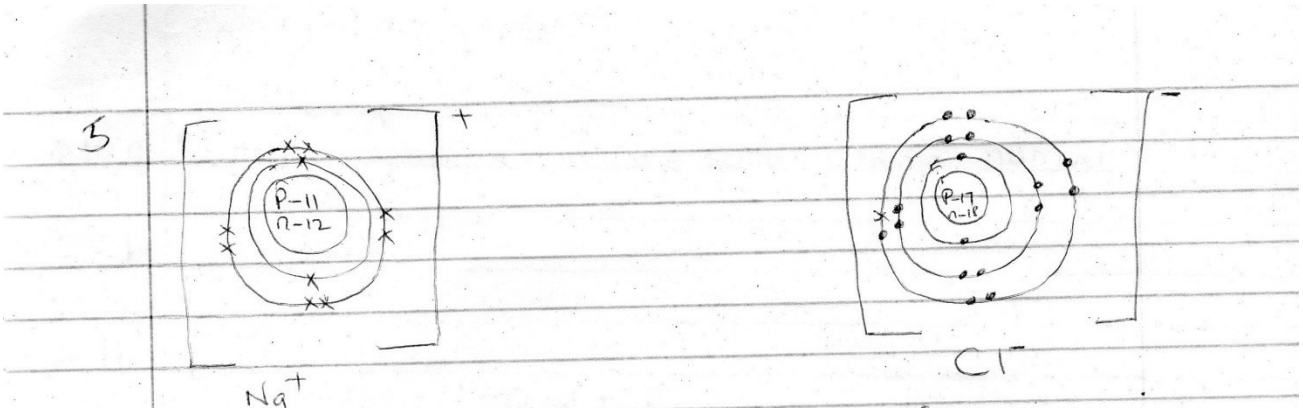
   $\frac{TCO_2}{96} = \sqrt{\frac{44}{64}}$ √½ $\frac{TCO_2}{96} = \frac{6.6332}{8}$

   $TCO_2 = \frac{96}{8} \times 6.6332$ √½ $= 79.5984$ √ 1

   NB: penalize ½ mk for wrong units in answer

4. a) 3 and 4

   b) Sugar (3) is made up of molecules hence cannot conduct in 4 ions are not mobile to conduct electric current.



NB: Number of protons in the nucleus should be indicated correctly.

6. a) K

   b) M

7. It changes from blue to a white solid; because the acid is a dehydrating agent and remove water from the hydrated copper (ii) sulphate.

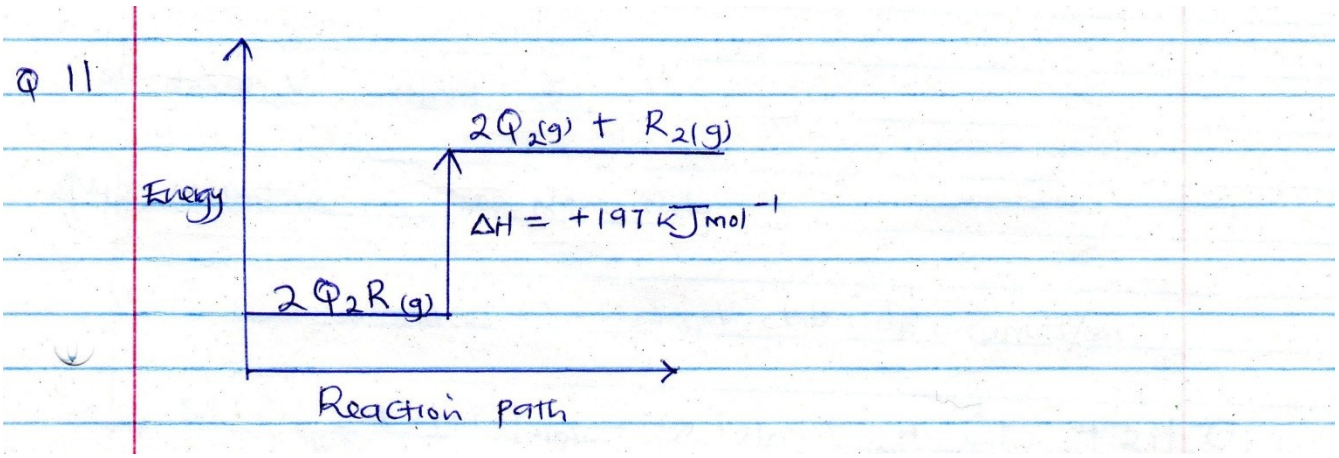
8. Acid for forward reaction is H_2O_2 since it donates a proton/acid for backward reaction is H_3O^+ since it donates a proton.

9. a) i) Oxygen /$O_{2(g)}$

   ii) Nitric (v) acid/ HNO_3

   b) Catalyst/speed up the reaction

10. a) D and F √½ they have the same atomic number √½
    b) 7 – 3 = 4



12. a) $^{61}_{27}Co \longrightarrow {}^{61}_{28}Ni + {}^{0}_{-1}e-$

b) 12.8g $\underline{1^{st}\ t_{1/2}}$ 6.4g $\underline{2^{nd}\ t_{1/2}}$ 3.2g $\underline{3^{rd}\ t_{1/2}}$ 1.6g $\underline{4^{th}\ t_{1/2}}$ 0.8g ½

number of halflifes = 4 √½

one half life = $\frac{280}{4}$ √½ = 70 days√½

Alternatively

Remaining amount = $(\frac{1}{2})^n \times$ original amount

$0.8 = (\frac{1}{2})^n \times 12.8$ √½

$\frac{0.8}{12.8} = (\frac{1}{2})^n$

n log 0.5 = 0.0625

$n = \frac{\log 0.0625}{\log 0.5}$

n = 4 √½

One half life = $\frac{280}{4}$ √½ = 70 days √½ 4

13. a) 2F + 5 (-2) = 0 √½

2F = + 10

F = +5 √½

b) Group V (***reject*** **5**)

14. a) Chlorine NB: ***name only***

b) To remove traces of hydrogen chloride fumes/gas

c) $MnO_{2(s)} + 4HCl_{(aq)} \longrightarrow MnCl_{2(aq)} + Cl_{2(g)} + 2H_2O_{(l)}$

15. High temperature increases the kinetic energy of the reacting particles hence they collide more frequently and effectively.

16. a) Magnetite/haematite/siderite

b) $CaO_{(s)} + SiO_{2(s)}$ _____ $CaSiO_{3(s)}$

17. a) i) X – calcium carbonate /$CaCO_3$

ii) Y- Calcium oxide/CaO

b) Mix sodium carbonate solution with calcium nitrate solution √½filter √½ wash √½ the residue with distilled water, filter and dry it between filter papers √½ (any other soluble carbonate and any other soluble calcium salt

18. a) i) The solution changed from pale green to yellow

ii) Brown precipitate was formed insoluble in excess sodium hydroxide.

b) $Fe^{3+}_{(aq)} + 3OH^-_{(aq)} \longrightarrow Fe(OH)_{3(s)}$

19. a) Nitrogen

b) Copper turnings changed from brown to black

20. a) The enthalpy change that occurs when one mole of a substance is formed from its constituent elements in their standard states.

b) $4C_{(s)} + 5H_{2\ (g)} \longrightarrow C_4H_{10(g)}$

$4CO_{2(g)} + 5\ H_2O_{(l)}$

$H_f\ (C_4H_{10}) = 4(-394) + 5(-286) - (-2881)$ √ (1)

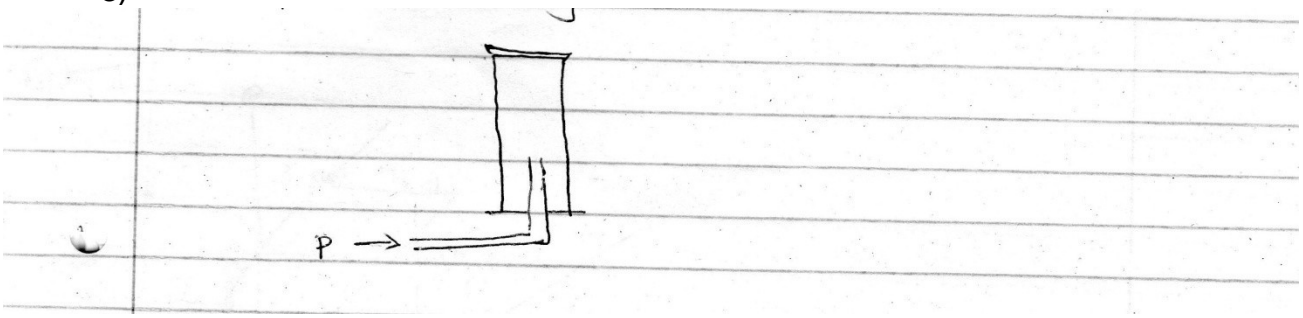
$= -1576 - 1430 + 2881$ √ (1)

$= -125kJmol^{-1}$ √ (1)

21. a) Ammonia

b) $Ca(OH)_{2(s)} + 2NH_4Cl_{(s)} \longrightarrow CaCl_{2(s)} + 2H_2O_{(l)} + 2NH_{3(g)}$

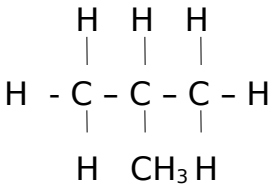
c)



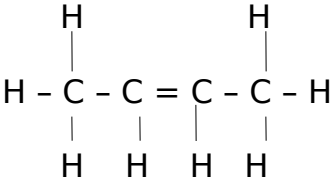
22. a) Evaporation

b) Fractional distillation

23. a) i)



ii)



b) ethylethanoate

24. a) Electrode A ½ , positive charge ½

b) it remains the same ½ ; because the anode dissolves to give Cu^{2+} and Cu^{2+} are discharged at the cathode to form copper metal.

c) $Cu^{2+}{}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$

25. i) Manganeze (iv) oxide/MnO_2

ii) - Used to aid breathing in hospitals
- Used in oxyacetyene flame
- Used by mountain climbers
- Used by sea divers/accept other commercial uses

26. a) Iron (ii) sulphide

b) - 2/3 atmospheres
- 450^0C
- Vanandium (V) oxide catalyst

27. - Increasing the pressure
- lowering the temperature

28. a) $1000cm^3$ NaoH _____ 0.25ml

$23cm^3$ ---------- ?

$\frac{23 \times 0.25}{1000}$ ½

= 0.00575mol ½

Reaction ratio 1:1

Moles of HCl reacted = 0.00575

0.2mol _____1000
0.00575 ___ ?

$= \frac{0.00575 \times 1000}{0.2}$ ½

= 28.75 ½

29. Si H

$\frac{8}{28}$ $\frac{1.12}{1}$

Mol ratio 0.286: 1.12 (1)

$\frac{0.286}{}$: $\frac{1.12}{}$

0.286 0.286

1 : 3.916
1 : 4

SiH_4 (1)

30. a) $Zn(s) + 2Ag^{+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + 2Ag_{(g)}$ (1)

b) e.m.f 0.76V + 0.8V (1)

= + 1 .56V (1)

31. a) Carbon (ii) oxide

b) absorb CO_2

c) $2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$

32. a) halogen

b) 17

33. i) $CuSO_4$ (1) solubility of $CUSO_4$ at 35^0C if 28g/100g of water

ii) CuSO4 38 – 28 = 10g of crystals formed (1) more soluble

*** E N D ****