

FORM 4 END OF TERM 2 EXAM

CHEMISTRY

Paper 1

July 2018

MARKING SCHEME



$$\frac{x}{100} \times 10 \left(\frac{100-x}{100} \right) 11 = 10.28 \checkmark \frac{1}{2}$$

$$\frac{x}{100} \times 10 + \left(\frac{100-x}{100} \right) 11 = 10.28$$

$$10x + (100 - x)11 = 1028$$

$$10x + 100 - 11x = 1028 \checkmark \frac{1}{2}$$

$$10x - 11x = 1028 - 1100$$

$$+ x = +72$$

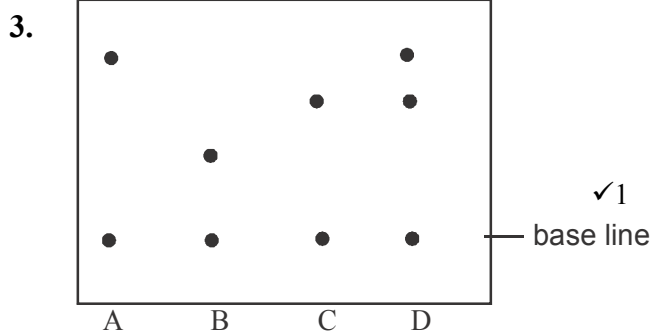
$$x = 72\% \checkmark \frac{1}{2}$$

$${}_{5}^{10}\text{R} = 72\%$$

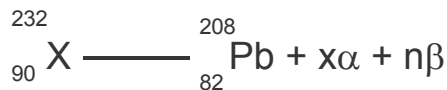
$${}_{5}^{11}\text{R} = 28\%$$

2. Since NH_4Cl sublimes $\checkmark 1$ and CaCl_2 does not sublime

Heat the mixture, ammonium chloride sublimes into vapour and condense on the cooler parts of heating tube. CaCl_2 will remain at the bottom of the heating tube



4. A and C



$$4x + 0n = 24$$

$$4x = 24$$

$$x = 6$$

$$2x + (-1n) = 8$$

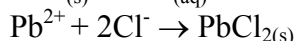
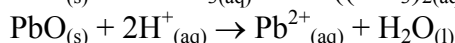
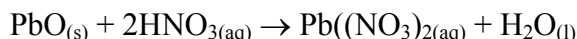
$$2x - 1n = 8$$

$$(2 \times 6) - 1n = 8$$

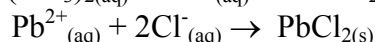
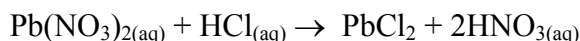
$$12n - 1n = 8$$

$$n = 4$$

5. First react PbO with nitric (V) acid to set lead nitrate. React lead nitrate with hydrochloric acid to form lead chloride



or



6. The yield of methanol will increase \checkmark since forward reaction rate is favoured by increase in temperature \checkmark

7. a) Mass increased $\checkmark 1$

Copper combine with oxygen from air to form heavier copper two oxide $\checkmark 1$

b) Mass decreased $\checkmark \frac{1}{2}$

Copper (II) nitrate decomposes to produce nitrogen (IV) oxide and oxygen that escapes into the air leaving lighter copper (II) oxide $\checkmark 1$

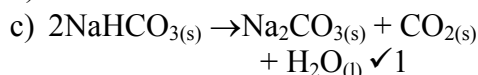
8. a) $2\text{H}^+_{(aq)} + 2\text{e}^- \rightarrow \text{H}_{2(g)} \checkmark 1$

b) i) Mg

ii) HCl

9. a) Ammonia gas or $\text{NH}_{3(g)} \checkmark 1$

b) Filtration $\checkmark 1$



10. Ammonium chloride decomposes on heating to produce ammonia gas and hydrogen chloride

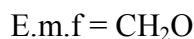


NH_3 is lighter hence diffuse faster than HCl gas

11. Atomic number	Group	Period
15	V	3
37	I	5

12. C	H	O
40	6.7	53.3
12	1	16
$\frac{40}{12} = 3.33$	$\frac{6.7}{1} = 6.7$	$\frac{53.3}{16} = 3.33$
12	1	16

$$\frac{3.33}{3.33} = 1 \quad \frac{6.7}{3.33} = 2 \quad \frac{3.33}{3.33} = 1$$



b) (CH₂O)_n = 60
 30n = 60
 n = 2
 M.f = C₂H₄O₂

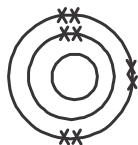
13. $\Delta H = MC\Delta T$
 $m = 500\text{g}$ $c = 4.2$ $DT = 32 = 23 = 9$
 $\frac{500}{1000} \times 9 \times 4.2 \text{KJkg}^{-1} = 18.9\text{KJ}$
 $0.7\text{g} \rightarrow 18.9\text{kg}$
 $\rightarrow 380$
 $\frac{0.7 \times 380}{18.9} = 14.07\text{g}$

14. Hydrogen bromide remains in molecular form in benzene ✓1
 In water it dissociates into Br⁻ and H⁺ ions making the solution acidic as such reacting with basic sodium carbonate ✓1

15. a) Sodium hydroxide / NaOH ✓1

b) Blue precipitate ✓½, it dissolves to form a deep blue solution

16. E.A = 2.6



17. a) P - sodium ethanoate ✓1
 Q - methane ✓1

b) Substitution ✓1

18. a)

R-COO ⁻ Na ⁺	They are cheaper compared to soapless detergent	Form scum with hard water
R-SO ₃ ⁻ Na ⁺	They don't form scum with Mg ²⁺ & Ca ²⁺	made from petroleum products / expensive

b) B / R-OSO₃⁻Na⁺
 - because it does not form scum with hard water

19. a) $\text{Ag}^+_{(\text{aq})} + \text{e}^- \rightarrow \text{Ag}_{(\text{s})}$

b) At the anode silver anode dissolves with loss of electrons to form silver ions which gain electrons to form the metal coating

Reason
 - it dissolved because it dipped into its solution

20. a) Ba²⁺ ✓1 reject name
 Cl⁻ ✓1 reject name

b) $\text{Ag}^+_{(\text{aq})} + \text{Cl}^-_{(\text{aq})} \rightarrow \text{AgCl}_{(\text{s})}$ ✓1

21. a) Wood ash is basic. It could therefore react with aluminium oxide coating on aluminium utensils VI

b) i) Its strong ✓1
 ii) Not easily corroded ✓1
 iii) Its light ✓1
any 2 correct

22. Luminous flame	Non-luminous flame
Produces soot	non-sooty
Produces less heat	produces more heat
Have four zone	has three zones
burns with a yellow flame	burns with blue flame

23. $\text{Mg}_{(\text{s})} + \text{H}_2\text{O}_{(\text{g})} \rightarrow \text{MgO}_{(\text{s})} + \text{H}_{2(\text{g})}$ ✓1

b) Insoluble / slightly soluble in water ✓1

c) Used in hot air balloon
 Manufacture of ammonia in Haber process
 Hardening of oils
 Rocket fuel
 Manufacture of HCl
any 2 correct

24. a) An acid is a proton donor
- b) A strong acid - an acid that ionizes fully in water to release a large number of H^+ ions
concentrated acid contains a large number of acid molecules per given volume
25. a) B ✓ $\frac{1}{2}$ it is neutral ✓ $\frac{1}{2}$
- b) C ✓1 aluminium chloride is acidic hence will dissolve in an alkaline solution ✓1
26. i) C_2H_5OH ✓1 or CH_3CH_2OH
- ii) CH_3CH_2Cl ✓1 or C_2H_5Cl
- iii) Process T - dehydration ✓1
27. The strength of the metallic bond ✓1 increases from Na to Al due to increase in the number of delocalised electrons ✓1
- b) Due to increase in the number of protons from Na to Al
28. Zinc blende Zn_s }
Calamine $ZnCO_3$ } any one
- b) $ZnO_{(s)} + CO_{(s)} \rightarrow Zn_{(g)} + CO_{2(g)}$
- c) Galvanizing metals (iron)
Dry cell casing
Used to make alloys e.g. brass
29. Incomplete combustion of carbon or
- $C_{(s)} + \frac{1}{2}O_{2(s)} \rightarrow CO_{(g)}$ ✓1
- b) SO_2 ✓1, NO_2 ✓1, CO_2 ✓1
any two

