HILLCREST HIGH SCHOOL
PHYSICAL SCIENCE
GRADE 10

PAPER 1 - CHEMISTRY MEMO

NOVEMBER 2021
TIME: 2 HRS **TOTAL : 100**

SECTION A

QUESTION 1: MULTIPLE-CHOICE **(2 x 5 = 10)**

1.1 C √√ (2)
1.2 B √√ (2)
1.3 D √√ (2)
1.4 A √√ (2)
1.5 D √√ (2)

SECTION B

QUESTION 2 **(6)**

2.1.1 R √ (1)

2.1.1 Q √ (1)

2.2 element √ (1)

2.3 evaporation √ and condensation √ (2)

2.4 magnetic √ property (1)

QUESTION 3 **(10)**

3.1. 1 √ √ 3.1.2 √ √

3.2.1 the Ek is decreasing and movement of the particles is decreasing √ (2)
and they are getting closer together √

3.2.2. the forces of attraction between particles is increasing. √ (1)

3.3.1 sublimation – change of phase from solid to gas √ √ (2)

3.3.2 physical change √ (1)

QUESTION 4 **(8)**

4.1 decrease √ (1)

4.2 Na : outer energy level is not full√
its unpaired valence electron √
is also further from the nucleus √
than the paired valence electrons of Ar, which is more stable and has a smaller A.R (3)

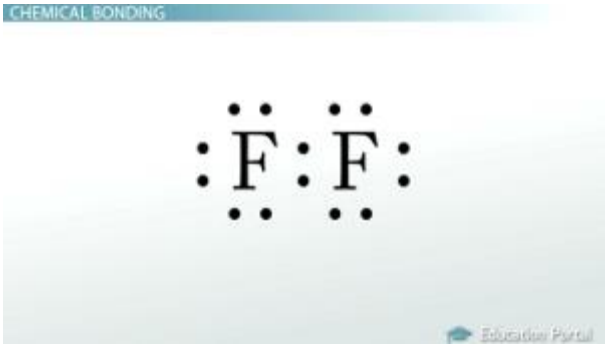
4.3 higher √
the 2nd second electron is in a pair √
and also in full energy level √
which is more stable √
and closer to the attractive pull of the nucleus√. (4)

QUESTION 5 **(10)**

5.1.1 D √ (1)

5.1.2. A √ (1)

5.2 $1s^2$ $2s^2$ $2p^6$ √√ (2)

5.3 

√√ (2)

5.4 B and C √ (1)

5.5. H_2 + F_2 → 2 HF √ √ √ (3)

QUESTION 6 **(4)**

6.1.1 potassium permanganate √ (1)

6.1.2 iron (II) phosphate √ (1)

6.2.1 $(NH_4)_2Cr_2O_7$ √ (1)

6.2.2 CH_3COOH √ (1)

QUESTION 7 **(40)**

7.1.1 atoms of the same element with the same atomic number √
but different mass number √ (2)

7.1.2 let % Rb – 87 = x the % Rb – 85 = (100 - x)

85,468 = $(\frac{x}{100}$ x 87) √ + $(\frac{(100-X)}{100}\ x\ 85)$ √

8546,8 = 87x + 8500 – 85x

8546,8 – 8500 = 87x - 85x
46,8 = 2x
23,4 = x √

% Rb – 87 = 23,4% √ (4)

7.2.1 m = nM √
M = 4,5 x 64 √
m = 288g √ (3)

7.2.3 n = $\frac{m}{M}$ = $\frac{75}{30}$ √ = 2,5 mol

N_o = n Na √ = 2,5 x 6,02 x 10^{23} √

No = 1,505 x 10^{24} molecules

No of H atoms = 6 x No = 6 x 1,505 x 10^{24} √
= 9,03 x 10^{24} atoms H √ (5)

7.3.1 A solution of known concentration √ (1)

7.3.2 c = $\frac{m}{M}$ x $\frac{1000}{v}$ √

c = $\frac{4,25}{106}$ √ x $\frac{1000}{200}$ √

c = 0,2 mol.dm^{-3} √ (4)

7.4.1 let 1% = 1g

nC = $\frac{m}{M}$ = $\frac{52,12}{12}$ = 4,34 mol √

nH = $\frac{m}{M}$ = $\frac{13,13}{1}$ = 13,13 mol √

nO = $\frac{m}{M}$ = $\frac{34,73}{16}$ = 2,17 mol √

mole ratio C : H : O

4,34 : 13,13 : 2,17

actual ratio 2 : 6 : 1 √

Emp formula = C_2H_6O √ (5)

7.4.2 $\frac{molar\ mass}{emp\ mass}$ √ = $\frac{138}{46}$ = 3 √

.

Molecular formula = 3 x EF = $C_6H_{18}O_3$ √ (3)

7.5 Sulphuric acid (H_2SO_4) reacts with ammonia gas (NH_3) to produce the fertilizer ammonium sulphate according to the equation

$H_2SO_4 + NH_3 \rightarrow (NH_4)_2SO_4$

7.5.1 $H_2SO_4 + 2\ NH_3 \rightarrow (NH_4)_2SO_4$ √ √ (2)

7.5.2 34g NH_3 √ → 132g $(NH_4)_2SO_4$ √

170g NH_3 → $\frac{132}{34}$ x 170 √

➔ 660g $(NH_4)_2SO_4$ √ (4)

7.5.3 % yield = $\frac{actual\ yield}{theoretical\ yield}$ x $\frac{100}{1}$ √

= $\frac{500}{660}$ x $\frac{100}{1}$ √

= 75,76% √ (3)

7.6.1 13,2 – 7.4 √ = 5,8g √ (2)

7.6.2 mole ratio of $ZnSO_4$: H2O

$\frac{m}{M}$: $\frac{m}{M}$ √

$\frac{7,4}{161}$: $\frac{5,8}{18}$ √

0,0459 : 0,322 √

Actual ratio 1 : 7 √

Formula = $ZnSO_4 \cdot 7\ H_2O$ √

zinc sulphate heptahydrate √ (6)

QUESTION 8 **(8)**

8.1.1 $2\ HNO_3 + K_2CO_3 \rightarrow 2\ KNO_3 + H_2O + CO_2$ √√ (2)

8.1.2. potassium nitrate √√ (2)

8.1.3

	K2CO3	:	CO2	
mole ratio	1	:	1	√
	$n = \frac{m}{M}$		$v = n\,Vo$	
	$n = \frac{345}{138}$ √		v = 2,5 x 22,4 √	
	n = 2,5 mol		v = 56 dm^3 √	(4)

TOTAL 100