



ALEXANDER ROAD HIGH SCHOOL

SEPTEMBER 2019

60 MIN

PHYSICAL SCIENCE CONTROL TEST MEMO

JA, MH

TOTAL = 60

GRADE 10

**QUESTION 1: Multiple choice**

- 1.1 C ✓✓  
1.2 A ✓✓  
1.3 D ✓✓  
1.4 C ✓✓  
1.5 D ✓✓  
1.6 B ✓✓

[12]

**QUESTION 2:**

- 2.1  $N_2 + 3 H_2 \rightarrow 2 NH_3$  ✓reactants ✓products ✓balancing (3)  
2.2  $(NH_4)_2SO_4$  ✓✓ (2)  
2.3 Mass cannot be created or destroyed in chemical reactions. ✓ (1)  
2.4  $M_{reactants} = 2(14) + 6(1) = 34 g.mol^{-1}$  ✓ (3)  
 $M_{products} = 2(14 + 3(1)) = 34 g.mol^{-1}$  ✓  
∴ Mass is conserved. ✓  
2.5 Liquid phase ✓ (1)

[10]

**QUESTION 3:**

- 3.1 Volume, temperature, any other acceptable variable ✓ (1)  
3.2 Direct proportionality ✓ (1)  
3.3 The higher the concentration, the more ions ✓ there are in the solution and therefore there is a greater movement of charge ✓ resulting in a higher conductivity. (2)  
3.4 LESS THAN ✓,  $Cu(OH)_2$  is insoluble ✓ and therefore will not form ions. (2)

[6]

#### QUESTION 4:

4.1.1 Aqueous ✓ (1)

4.1.2 Solid ✓ (1)

4.2.1 The mass of one mole of a substance. ✓ (1)

4.2.2 Number of moles of solute per unit volume of solution. ✓ (1)

4.3.1  $M_{Na_2SO_4} = 2(23) + 32 + 4(16) = 142 \text{ g.mol}^{-1}$  ✓✓ (answer only: 2/2) (2)

4.3.2  $n = \frac{m}{M}$  ✓

$$n = \frac{28,4}{142}$$

$$n = 0,2 \text{ mol} \quad \checkmark$$

$\left[ \oplus \right]$  – marking from 4.3.1

$$c = \frac{n}{V} \quad \checkmark$$

$$c = \frac{0,2}{0,25} \quad \checkmark$$

$$\therefore c = 0,8 \text{ mol.dm}^{-3} \quad \checkmark$$

(5)

4.3.3  $n = \frac{m}{M}$

$$0,2 \quad \checkmark = \frac{m}{137 + 32 + 4(16)} \quad \checkmark$$

$$0,2 = \frac{m}{233}$$

$$\therefore m = 46,6 \text{ g}$$

(3)

4.3.4 % Yield =  $\frac{40}{46,6} \times 100 \quad \checkmark \quad \left[ \oplus \right]$  – marking from 4.3.3

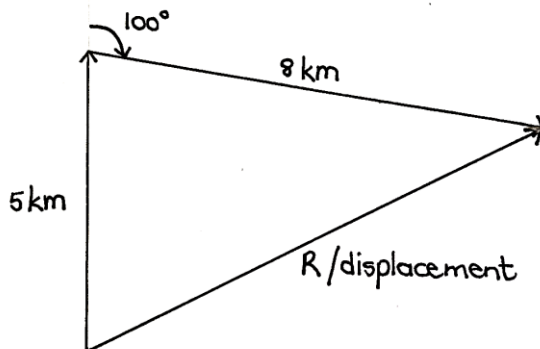
$$\therefore \% \text{ Yield} = 85,84\% \quad \checkmark \quad (\text{answer only: 2/2})$$

(2)

**[16]**

### QUESTION 5:

- 5.1 The change/difference in position. ✓✓ (2)
- 5.2 ✓ 5km vector (magnitude AND direction correct WITH label).  
✓ 8km vector (magnitude AND direction correct WITH label). (2)
- 5.3 ✓ Draws resultant vector from tail of first vector to head of last vector.



- Magnitude: 8,7 km (allow 8,6 – 8,8 km) ✓ (2)
- 5.4 65° (allow 64 – 66) of resultant  
Direction to walk: 245° (180 + bearing of resultant) ✓ (1)

[7]

### QUESTION 6:

- 6.1  $T = \frac{1}{f} \checkmark = 0,025 \text{ s} \checkmark$
- $v = \frac{\Delta x}{\Delta t} \checkmark = \frac{0,038 \checkmark}{0,05} = 0,76 \text{ m.s} \checkmark$  (5)
- 6.2  $a = \frac{\Delta v}{\Delta t} \checkmark = \frac{0,28 - 0,76 \checkmark}{3 \times 0,025 \checkmark}$   
 $= -6,4 \text{ m.s}^{-2} \text{ to the left or } 6,4 \text{ m.s}^{-2} \text{ to the right} \checkmark$  (4)

[9]