P.1 MEMO JUNE 2011

PHYSICAL SCIENCES GRADE 10

QUESTION 1

1.1 Acceleration (1)

1.2 Amplitude (1)

1.3 Current (1)

1.4 Valence (electrons) (1)

1.5 Conductivity (1)

[5]

QUESTION 2

2.1	A	B	~~C~~	D
2.2	~~A~~	B	C	D
2.3	A	B	C	~~D~~
2.4	~~A~~	B	C	D
2.5	A	~~B~~	C	D
2.6	A	B	~~C~~	D
2.7	A	B	C	~~D~~
2.8	A	~~B~~	C	D
2.9	A	B	~~C~~	D
2.10	A	~~B~~	C	D

[10 X 2 =20]

TOTAL SECTION A : 25 MARKS

QUESTION 3

3.1 $v = \Delta x/\Delta t$ ✓
$v = 60/4$ ✓
$v = 15\ m{\cdot}s^{-1}$ (2)

3.2 $v_f = v_i + a\,\Delta t$ ✓
$= 0$✓ $+ (0,8)\ 20$✓
$v_f = 16\ m{\cdot}s^{-1}$ ✓ (4)

3.3 For the bike
$v_f^2 = v_i^2 + 2a\,x$ ✓
16^2✓ $= 0^2 + 2(0,8)\,x$ ✓
$x = 160$ m ✓

OR

$\Delta x = v_i \Delta t + {}^1/_2 a \Delta t^2$ ✓
$= (0)(20)$ ✓ $+ ½\,(0,8)$ ✓ $(20)^2$
$= 160$ m ✓

For the car
$v = \Delta x/\Delta t$
$v = \Delta x / 24$ ✓
$\Delta x = 360$ m ✓

Therefore after 20s 360 m - 160m = 200 m ✓ (7)

3.4 Slow down and proceed only when it is green and thus prevent an accident. (2)

QUESTION 4

4.1 a) Frequency = 45/60✓
= 0.75 Hz✓

b) Period = 1/frequency
= 1/0.75✓
= 1.34 s✓

c) velocity = frequency x wavelength✓
50 = 0.75 x wavelength
Wavelength = 50/0.75✓
= 66.67 m✓

d) Length = n(wavelength/2) ✓
= 20(66.67/2)✓
=666.7m✓

4.2 a) Constructive interference✓

b) 6cm✓✓

4.3 Frequency = No. of complete waves✓ that pass a point in a medium in one second✓✓

Period = Time it takes for ONE✓ wave to pass a point in a medium. ✓

QUESTION 5

5.1 Investigative Q
Hyp
Method
Results
Discussion ✓✓ (2 or 0)

5.2 Expected outcome of the invest q ✓ (1)

5.3.1 size of magnets✓

5.3.2 force between the magnets✓

5.3.2 surface, temperature, etc. ✓ (1)

5.4 What is the relationship between the size of magets and the force between them? ✓ ✓ (2)

5.5 or or

Small – small		Big – small		Large – small	
Small – Big		Big – big		Large – big	
Small – large		Big - large		Large – large	

OR

Small – small	
Big – big	
Large – large	

✓✓ (2)

5.6 Marks allocated for: axes – names and units✓
Heading✓
Shape (should be bar graph) ✓ (3)

5.7 The hypothesis was met. ✓ There is a direct proportionality between the size of the magnets and the force (of repulsion or attraction) between the magnets✓ (2)

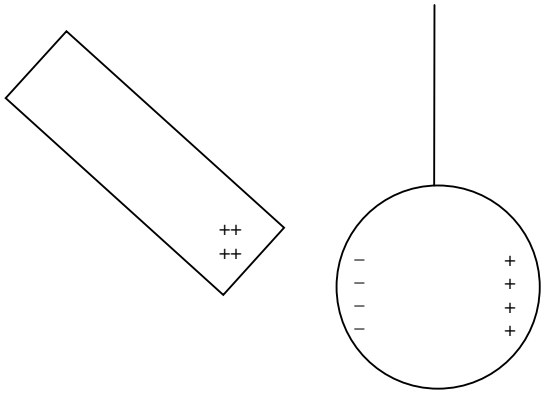
[15]

QUESTION 6

6.1 electrolyte✓ (1)

6.2 Charge can not be created or destroyed but can only be transferred from one <u>object</u> to another✓✓ (2)

6.3



✓ (1)

6.4 Touching between the 2 objects✓ in order for the electrons to move✓ from the sphere to the rod (2)

Question 7

7.1 $\frac{1}{R_P} = \frac{1}{24} + \frac{1}{12} = \frac{3}{24}$ ✓

$\frac{1}{R_P} = \frac{24}{3} = 8\Omega$ ✓

$R_T = 8 + 2 = 10\Omega$ ✓

7.2 $I = \frac{V}{R}$ ✓

$I = \frac{20}{10}$ ✓

$I = 2A$ ✓

7.3 $V = IR$ ✓

$V = (2)(2)$ ✓

$V = 4V$ ✓

7.4 $V_3 = 20 - 4$ ✓

$V_3 = 16V$ ✓

7.5 $I = \frac{V}{R}$ ✓

$I = \frac{16}{24}$ ✓

$I = 0.33A$ ✓

7.6 DECREASE

Question 8

8.1.1 29✓
8.1.2 29✓
8.1.3 Helium✓
8.1.4 16✓
8.1.5 16✓
8.1.6 18✓

8.2.1 D✓
8.2.2 C✓
8.2.3 E✓
8.2.4 A✓
8.2.5 F✓
8.2.6 B✓

8.3 Heterogeneous. ✓

8.4a Element that has the same atomic mass but different mass number OR
An element with the same number of protons but different number of neutrons. ✓✓

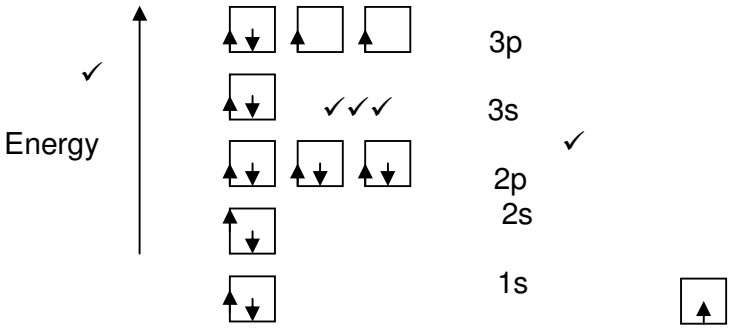
b. relative atomic mass = $\frac{(68.9257 \times 60.4\%) + (70.9249 \times 39,6)}{60.4 + 39,6}$ ✓ = 69,7174✓

Gallium✓

8.5.1 H_2S✓
8.5.2 NaOH✓
8.5.3 $(NH_4)_2SO_4$✓

Question 9

9.1



b) $1s^2 2s^2 2p^6 3s^2 3p^4$✓✓

c) [Ne] $3s^2 3p^4$✓✓

9,2 a) 2000 kJ/mol ✓

b) Generally increases across a period✓and decreases down a group. ✓

c) Boron's electrons occur at higher energy levels and are therefore further away from the nucleus✓ therefore it requires less energy to remove the electron✓ as opposed to berylium which occurs at a lower energy level and therefore closer to the nucleus and therefore harder to remove the first electron. ✓ (Add energy level diagrams to emphasise point) ✓✓

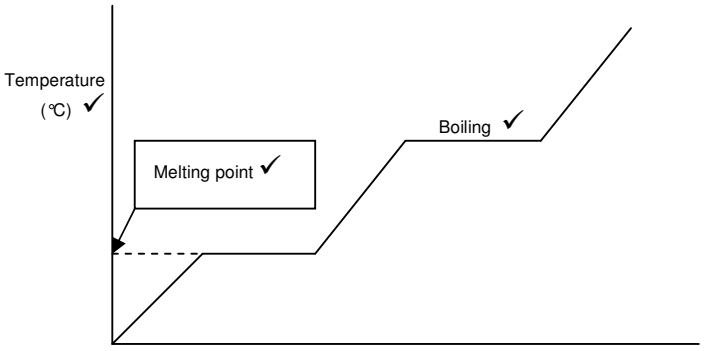
Question 10

10.1 The measure of the average kinetic energy of the particles✓✓✓ (3)

10.2 Melting – the phase changes from solid to liquid ✓✓
Boiling - the (phase) changes from liquid to gas (when the internal vapour pressure = external atmospheric pressure.) ✓✓
(4)

10.3 Exo: energy released more than energy absorbed
Thus: Energy transferred = energy released – energy absorbed ✓ (or swopped)
818 = energy released – 2648✓
Energy released = 818 + 2648
= 3466 kJ (unit must be there) ✓ (3)

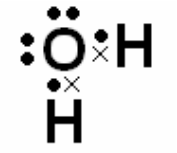
10.4



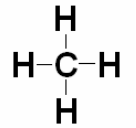
(3)

10.5 The temperature is constant: particles move out of their positions, that takes up energy. ✓
Then temp. rises because particles move faster (higher average E_k) in the liq phase. ✓ (2)

Question 11

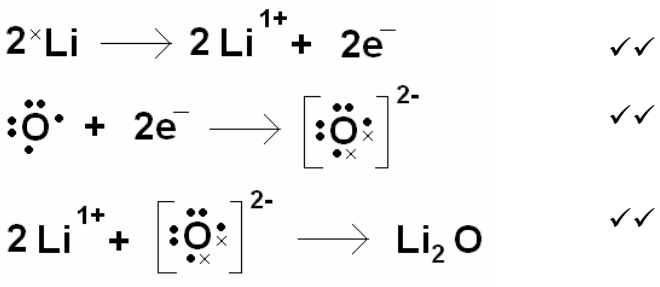
11.1 

O e's ✓
H e's ✓
Shape ✓

11.2 Covalent
11.3 Polar
11.4 Polar
11.5 

✓✓

11.6 Dispersion ✓✓ (if van der waals ✓)
11.7 Hydrogen bonding
11.8 SnH_4 is larger or CH_4 is smaller

11.9 

$2Li \longrightarrow 2Li^{1+} + 2e^-$ ✓✓

$O + 2e^- \longrightarrow [O]^{2-}$ ✓✓

$2Li^{1+} + [O]^{2-} \longrightarrow Li_2O$ ✓✓

11.10 Metallic✓

TOTAL: 170 MARK