ALEXANDER ROAD HIGH SCHOOL

JUNE 2021 | **PHYSICAL SCIENCES MEMO** | 2 HOURS

MH | **GRADE 10** | TOTAL = 100

PHYSICS

SECTION A

QUESTION 1:

1.1 B ✓✓

1.2 D ✓✓

1.3 C ✓✓

SECTION B

QUESTION 2:

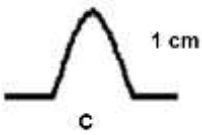
2.1 The distance between two successive points in phase. (2)

2.2 upwards (1)

2.3.1 f = $\frac{1}{5}$ ✓=0,2 Hz ✓ (2)

2.3.2 V = f.λ ✓ =0,2 x 1,5 ✓ = 0,3 m.s^{-1} ✓ (3)

2.4.1 (partial) destructive interference (1)

2.4.2 

1 mark sketch
1 mark amplitude (2)

[11]

QUESTION 3:

3.1.1 compressions (1)

3.1.2 wavelength (1)

3.2 decrease (1)

3.3 $v = \frac{\Delta x}{\Delta t}$ *or* $speed = \frac{distance}{time}$ ✓ time = 0,05/2 = 0,025 s ✓ (4)

$342 = \frac{\Delta x}{0,025}$ ✓

$\Delta x = 8,55m$ ✓

[7]

QUESTION 4:

4.1 A 'packet' of energy found in light. (2)

4.2 $E = \frac{c.h}{\lambda}$ ✓ (4)

$E = \frac{3\times10^{8}\times6,63\times10^{-34}P}{532\times10^{-9}\,P}$

$E = 3,74 \times 10^{-19}J$ ✓

4.3. Generated by an accelerated charge. (1)

[7]

QUESTION 5:

5.1 B to A (1)

5.2 $Q = \frac{Q_A+Q_B}{2} = \frac{2,8+4,5}{2}$ ✓ $= 3,65\ C$ ✓ (2)

5.3 4,5 – 3,65 = 0,85 C or 3,65 – 2,8 = 0,85 C ✓ (4)

$n = \frac{Q}{q_e}$ ✓ = $\frac{0,85}{1,6\times10^{-19}}$ ✓ $= 5,31 \times 10^{18}\ electrons$ ✓

5.4 an isolated system (1)

[8]

QUESTION 6:

6.1 $\frac{1}{R_P} = \frac{1}{R_A} + \frac{1}{R_B} P = \frac{1}{2} + \frac{1}{4}$ P or $R_P = \frac{R_A R_B}{R_A+R_B} = \frac{2\times4}{2+4}$ (4)

$R_T = 5 + 1,33\ P = 6,33\Omega$ ✓

6.2 $V = IR$ ✓ (3)

$12 = I \times 6,33$ ✓

$I = 1,89\ A$ ✓

6.3 Rate of flow of charge. (2)

6.4 $V_3 = IR\ P = 1,89 \times 5 = 9,45V$ ✓

$V_2 = 12 - 9,45 = 2,55V$ ✓

$V_2 = IR$

$2,55 = I \times 2$ ✓

$I = 1,28\ A$ ✓ (5)

6.5 $Q = It\ P = 1,28 \times 60\ P = 76,8\ C$ ✓ (3)

[17]

TOTAL SECTION B = [50]

CHEMISTRY

SECTION C

QUESTION 7:

7.1 C ✓✓

7.2 C ✓✓

7.3 D ✓✓

SECTION D

QUESTION 8:

8.1 The temperature where the vapour pressure of the liquid is equal to the atmospheric pressure. (2)

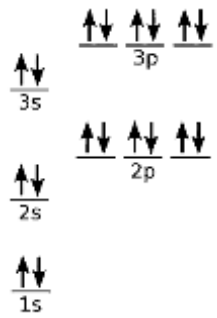
8.2 Steam cannot escape from pressure cooker – higher atmospheric pressure ✓ (3)
More energy required for vapour pressure = atmospheric pressure ✓
More energy – higher temperature ✓ (temp measure of avg. E_k of particles)

8.3 Particles have high E_k ✓ (3)
Big spaces between particles ✓
Weak forces of attraction between particles ✓

[8]

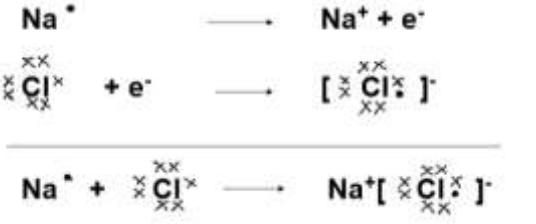
QUESTION 9:

9.1 Table salt (1)

9.2 

orbitals correct ✓
opposite spin ✓
total numbers of electrons ✓ (3)

9.3 $1s^2\ 2s^2\ 2p^6$ format correct ✓ number of electrons correct ✓ (2)

9.4 

✓
✓
✓ (3)

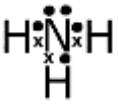
9.5 Needs moving charges ✓
Solid – ions locked in lattice, cannot move ✓ (2)

[11]

QUESTION 10:

10.1	Two atoms with same number of protons, but different number of neutrons.	(2)
10.2	$\frac{15\times35\,P+5\times37P}{20P} = 35{,}5\,P$	(4)
10.3	Chlorine (name, not symbol)	(1)
		[7]

QUESTION 11:

11.1.1	Ionic bonding	(1)
11.1.2	Metallic bonding	(1)
11.2.1	Bond formed by the overlapping of half-filled orbitals✓ resulting in the sharing of electrons.✓	(2)
11.2.2	a) pure/non-polar covalent b) polar covalent	(2)
11.2.3		(2)
11.2.4	**O=O**	(1)
11.3.1	$(NH_4)_2SO_4$ polyatomic ions correct ✓ ratio correct ✓	(2)
11.3.2	15 atoms	(1)
		[12]

TOTAL SECTION D = [38]

GRAND TOTAL = [100]