Grade 11 Science September 2019 Test MEMO

1.1 D

1.2 C

1.3 C

1.4 D

1.5 C

1.6 B

2.1.1. $V_T = I_T R_T$ ✓

$20 = I\left(8 + \frac{5 \times 10}{5+10}\right)$ ✓ ✓

$I = 1,76\ A$ ✓

2.1.2 $V_p = I R_p$ ✓

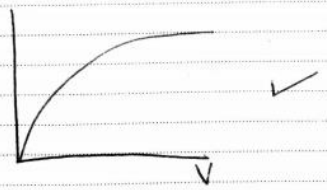
$= 1,76\left(\frac{5 \times 10}{5+10}\right)$ ✓

$= 5,87\ V$ ✓

2.1.3 $P = V I = 20(1,76) = 35,2\ W$ ✓ ✓

2.1.4 decrease ✓

2.2



✓ [12]

3.1 D ✓✓

3.2. Release of CO_2 ✓; greenhouse gas ✓. [4]

4.1 The force per unit charge that a positive test charge will experience. ✓✓

4.2. $E_{net} = E_{Q_1} - E_{Q_2}$ ✓

$0 = \frac{kQ_1}{r^2} - \frac{kQ_2}{d^2}$ ✓

$\frac{9 \times 10^9 (2 \times 10^{-9})}{(0,2-x)^2} = \frac{9 \times 10^9 (3 \times 10^{-9})}{x^2}$ ✓ ✓

$\frac{2}{(0,2-x)^2} = \frac{3}{x^2}$

$x = 0,11\ m$

5.1 South pole ✓

5.2 The induced emf is directly proportional to the rate of change of magnetic flux linkage. ✓✓

5.3 $\Delta\phi = \phi_f - \phi_i$ ✓

$= BA(\cos\theta_f - \cos\theta_i)$

$= 0,4 \times 10^{-3}(\pi \cdot 0,12^2)(\cos 70° - \cos 30°)$ ✓

$= -9,48 \times 10^{-6}$

$\varepsilon = -N\frac{\Delta\phi}{\Delta t}$ ✓

$= -1000\ \frac{-9,48 \times 10^{-6}}{0,2}$ ✓

$= 4,74 \times 10^{-2}\ V$ ✓

6.1 An acid is a <u>proton/H^+ ion donor</u>. ✓

6.2 a_1 - HSO_4^- b_1 - SO_4^{2-} ✓✓
a_2 - H_3O^+ b_2 - H_2O ✓✓

6.3 HSO_4^- ✓

It acts as <u>both an acid</u> (reaction 2) <u>and a base</u> (reaction 1). ✓

6.4 Red. ✓

7.1 Reduction is a <u>gain of electrons</u>. ✓

7.2 H_2S ✓

The <u>oxidation number (of sulphur) decreases</u> meaning H_2S is oxidised and is therefore the reducing agent. ✓

7.3

$3H_2S$	$\rightarrow$	$3S + 6H^+ + 6e^-$	✓ oxidation half reaction ✓making #electrons same
$Cr_2O_7^{2-} + 14H^+ + 6e^-$	$\rightarrow$	$2Cr^{3+} + 7H_2O$	✓ reduction half reaction
$3H_2S + Cr_2O_7^{2-} + 8H^+$	$\rightarrow$	$3S + 2Cr^{3+} + 7H_2O$	✓ reactants ✓ products