Gr 12 Science Feb 2021 Control test 1 MEMO

1.1 B ✓ ✓

1.2 D ✓ ✓

1.3 B ✓ ✓

1.4 B ✓ ✓

2.1 **UPWARDS AS POSITIVE**
$F_{net} = 0$ ✓
$T_1 + (-w)$ ✓ $= 0$
$T_1 + (-mg) = 0$
$T_1 + (3)(-9,8)$ ✓ $= 0$
$T_1 = 29,40$ N
$T_1 = 29,40$ N ✓ upwards

2.2
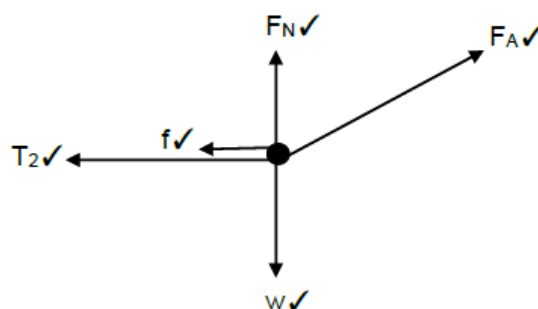
2.3 $T_2 = 29,40$ N ✓ (1)
Right is positive (5)
$F_{net} = 0$ ✓
$f + (-T_2) + (F_A\cos30°)$ ✓ $= 0$
$f - 29,40$ ✓ $+ 36\cos30° = 0$ ✓
$f = -1,78$ N
$= 1,78$ N left ✓

3.1 Every body in the universe attracts every other body with a force that is directly proportional to the product of their masses ✓ and inversely proportional to the square of the distance between their centres. ✓
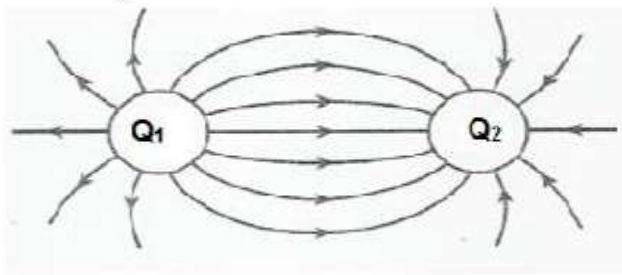
3.2 Equal to ✓

3.3 Newton 3 ✓

3.4 $F = \dfrac{GM_E M_C}{r^2}$ ✓

$F = \dfrac{(6,67 X 10^{-11})(6 X 10^{24}) ✓ (1 X 10^{15}) ✓}{(1,3 X 10^{11})^2 ✓}$

$= 2,37 \times 10^7$ N ✓ attraction/*aantrekkend*

4.1

✓ shape (bending and 90⁰ leaving sphere)
✓ directions
✓ no lines touching

4.2

$$E_1 = \frac{kQ_1}{r^2} \checkmark = \frac{(9,0\times10^9)(6\times10^{-6})\checkmark}{(4,2)^2\checkmark} = 3\,061,22 \text{ N.C}^{-1}$$

$$E_2 = \frac{kQ_2}{r^2} = \frac{(9.0\times10^9)(4\times10^{-6})\checkmark}{(1,2)^2} = 25000 \text{ N.C}^{-1}$$

$$E_{net} = E_1 + (-E_2) \checkmark$$
$$= 3\,061,22 + (-25\,000) \checkmark$$
$$= -2,19 \times 10^4$$
$$= 2,19 \times 10^4 \text{ N.C}^{-1} \text{ left/links} \checkmark$$

4.3 $$n_{e-} = \frac{Q_2}{Q_e} = \frac{(4\times10^{-6})}{(1,6\times10^{-19})} \checkmark = 2,5\times10^{13} \text{ electrons} \checkmark$$

5.1

OPTION 2/OPSIE 2	OR/OF
$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓	$R_P = \frac{R_1 R_2}{R_1 + R_2}$ ✓
$\frac{1}{R_p} = \frac{1}{12} + \frac{1}{2}$	$R_P = \frac{(12)(2)}{12 + 2}$
$R_P = 1,72\ \Omega$✓	$= 1,71\ \Omega$✓
$\varepsilon = I(R+r)$ ✓	
$= 1,4(1,72 + 0,5)$ ✓ ✓	$\varepsilon = I(R+r)$ ✓
$= 3,11$ V✓	$= 1,4(1,71+0,5)$ ✓ ✓
	$= 3,09$ V✓

5.2   Increase ✓