GRADE 10 PHYSICAL SCIENCES MEMO
PAPER 1

QUESTION 1

1.1 C ✓✓ (2)

1.2 C ✓✓ (2)

1.3 D ✓✓ (2)

1.4 C ✓✓ (2)

1.5 B ✓✓ (2)

[10]

QUESTION 2

2.1.1 transverse ✓ wave (1)

2.1.2 2 ✓ (Two) (1)

2.1.3 A; C; E✓ or B; D (1)

2.1.4 3 m ✓ ✓ (2)

2.1.5 $f = \frac{v}{\lambda}\checkmark = \frac{2}{2}\checkmark = 1\ Hz\ \checkmark$ (3)

2.1.6 $T = \frac{1}{f}\checkmark = \frac{1}{1}\checkmark = 1\ s\ \checkmark$ (3)

2.2.1 destructive ✓ interference (1)

2.2.2 0 ✓ (1)

[13]

QUESTION 3

3.1 $v = f\lambda\ \checkmark = 500(1{,}376)\ \checkmark = 688\ m.s^{-1}\ \checkmark$ (3)

3.2.1 B ✓ (1)

3.2.2 A ✓ (1)

3.2.3 B & C ✓ (1)

[6]

QUESTION 4

4.1 $\lambda = \frac{c}{f}\checkmark = \frac{3\times10^{8}\checkmark}{2{,}45\times10^{9}\checkmark} = 0{,}12\ m\checkmark$ (4)

4.2 E = hf ✓= 6,63 x 10^{-34}✓ (2,45 x 10^{9}) ✓ = 1,62 x 10^{-24} J ✓ (4)

4.3 Used as radar at weather stations. ✓
Used for satellite communication. ✓ (2)
Point-to-point communication links, wireless networks, microwave radio relay networks, radar, satellite and spacecraft communications, medical diathermy and cancer treatment, remote sensing, radio astronomy, particle accelerators, spectroscopy.

[10]

QUESTION 5

5.1 negative ✓ / negatively / – (1)

5.2 Q = n.e^{-} ✓= 3,75 × 10^{10}(-1.6 × 10^{-19}) ✓ = -6 × 10^{-9} C ✓ = -6 nC ✓ (4)

5.3 Attractive force ✓, because the two spheres carry opposite charges. ✓ (2)

5.4 Every charge in the universe consists of integer multiples of the charge on an electron.✓✓ (2)

[9]

QUESTION 6

6.1 The rate of flow of charges ✓✓ (2)

6.2.1 $V_{12\Omega} = IR\checkmark = 3(12)\checkmark = 36\ V$

$V_p = 43{,}5 - 36\checkmark = 7{,}5\ V\ \checkmark$ (4)

6.2.2 $I_{10\Omega} = \frac{V_p}{R} = \frac{7{,}5}{10}\checkmark = 0{,}75\ A\checkmark$ (2)

6.2.3

OPTION 1	***OPTION 2***
$I_R = 3 - 0{,}75\checkmark = 2{,}25\ A\ \checkmark$ $R = \frac{V_p}{I} = \frac{7{,}5}{2{,}25}\checkmark = 3{,}33\ \Omega\ \checkmark$	$R_T = \frac{V_T}{I_T} = \frac{43{,}5}{3} = 14{,}5\ \Omega\checkmark$ $\therefore R_p = 14{,}5 - 12\checkmark = 2{,}5\ \Omega$ $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$ $\frac{1}{2{,}5} = \frac{1}{10} + \frac{1}{R_2}\checkmark$ $\therefore R = 3{,}33\ \Omega\checkmark$

(4)

6.3 INCREASE, ✓ the total resistance increases, ✓ current decreases,✓ and therefore the potential difference increases. (3)

[15]

QUESTION 7

7.1 A single vector with the same effect that two or more vectors have together. ✓✓ (2)

7.2



✓ ✓ correct, labelled vectors
✓ correct, labelled resultant

(3)

[5]

QUESTION 8

8.1 The total energy in an isolated system remains constant.✓✓ (2)

8.2 $E_p = mgh$ ✓
$= (350)(9,8)(25)$ ✓
$= 85750$ J ✓ (3)

8.3 85750 J ✓ (1)

8.4 $E_M(A) = E_M(C)$ ✓
$mgh + ½mv^2 = mgh + ½mv^2$
85750 ✓ $+ 0 = 350(9,8)(12) + ½(350)v^2$ ✓
$v = 15,96$ m.s^{-1} ✓ (4)

8.5 INCREASE ✓

[11]

QUESTION 9

9.1 0 – 4s: The car is travelling forwards while <u>speeding up</u>/accelerating✓
4 – 8s: the car is travelling forwards at a uniform/<u>constant velocity</u> ✓
8 – 12s: The car is travelling forwards but slowing down/<u>decelerating</u> ✓
12 – 14s: the car is <u>stationary</u> ✓
14 – 16s: The car is <u>moving backwards and speeding up</u> ✓

(5)

9.2 The rate of change of velocity ✓✓ (1)

9.3 $a = \frac{V_f - V_i}{\Delta t}$ ✓ **OR** $V_f = V_i + 2a\Delta t$ ✓

$a = \frac{0-12}{14-8}$ ✓ ✓ $0 = 12 + 2a(4)$ ✓ ✓

$a = -3\ m.s^{-2}$ ✓ $a = -3m.s^{-2}$ ✓ (4)

9.4 $x = v.t$ ✓ **OR** $\Delta x = \frac{V_f + V_i}{2}\Delta t$ ✓

$x = (27.77)(1)$ ✓ $\Delta x = \frac{27.77 + 27.77}{2}(0.7)$ ✓

$x = 19.44m$ ✓ x = 19.44m ✓ (3)

9.5 $v_f^2 = v_i^2 + 2a\Delta x$ ✓

$0^2 = 27.77^2 + 2(-8)\Delta x$ ✓

$\Delta x = 48.19m$ ✓

Total distance = 19.44m + 48.19m
= 67.63m ✓ (4)

9.6 $v_f = v_i + a\Delta t$ ✓
$0 = (27.77) + (-8)\Delta t$ ✓
$\Delta t = 3.47s$ ✓ (3)

[21]

TOTAL: 100

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