1.9   C✓✓

QUESTION 6/VRAAG 6

6.1

Difference/Verskil	Similarity/Ooreenkoms
Amplitudes✓	Wavelength✓/Golflengte Period/Tydperk Frequency/Frekwensie Transverse/Transversaal **(Any one)/(Enige een)**

(2)

6.2.1   A and/en B✓
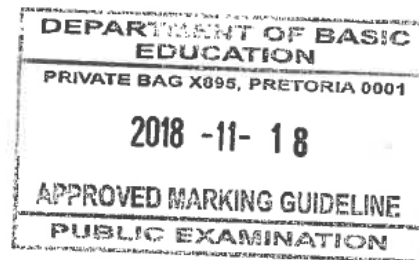
OR/OF
C and/en D✓

OR/OF
B and/en C

OR/OF
A and/en D

(1)

6.2.2   15 (mm) ✓

(1)

6.3   The <u>number of waves/wave pulses</u>✓ passing a point <u>per second</u>.✓ /Die <u>getal golwe/golfpulse</u> wat <u>per sekonde</u> by 'n punt verby beweeg.

(2)

6.4.1

$f = \dfrac{1}{T}$ ✓

$= \dfrac{1}{1,5}$ ✓

$= 0,67$ Hz ✓

(3)

6.4.2

| **POSITIVE MARKING FROM 6.4.1** **POSITIEWE NASIEN VANAF 6.1** **OPTION 1/OPSIE 1** $v = f\lambda$✓ $= (0,67)(0,1)$✓ $= 0,067$ m·s⁻¹ ✓ | **OPTION 2/OPSIE 2** $v = \dfrac{\Delta x}{\Delta t}$ **or/of** speed $= \dfrac{distance}{time}$ ✓ $= \dfrac{0,1}{1,5}$ ✓ $= 0,067$ m·s⁻¹ |

(3)
[12]

1.7 A✓✓   (2)

QUESTION/*VRAAG 8*

8.1.1 Infrared waves✓/*Infrarooi golwe* ✓   (1)

8.1.2 Radio waves **OR** microwaves✓/*Radiogolwe OF mikrogolwe* ✓   (1)

8.2.1 Packet of energy found in light✓✓
     Pakkie energie wat in lig aangetref word. ✓✓   (2)

8.2.2

OPTION 1/*OPSIE 1*:	OPTION 2/*OPSIE 2*:
$c = f \times \lambda$ ✓	$E = \dfrac{hc}{\lambda}$ ✓✓
3×10^8 ✓ $= f \times 620 \times 10^{-9}$ ✓	
$\therefore f = 4{,}84 \times 10^{14}$ Hz	$E = \dfrac{6{,}63 \times 10^{-34} \text{✓} \times 3 \times 10^8}{620 \times 10^{-9} \text{✓}}$ ✓
$E = hf$ ✓	
$= 6{,}63 \times 10^{-34}$ ✓ $\times 4{,}84 \times 10^{14}$	$E = 3{,}21 \times 10^{-19}$ J ✓
$= 3{,}21 \times 10^{-19}$ J ✓	

                             (6)

8.2.3 • Laser light has <u>high frequency and can penetrate</u> soft tissues of humans✓
      Laserlig het 'n <u>hoër frekwensie</u> ✓ *en kan sagte <u>weefsel indring</u>*
    • This can lead to <u>damage of eye tissue</u>✓
      Dit kan <u>skade aan oogweefsel</u> veroorsaak ✓   (2)

                             [12]

Elektromagnetiese Straling Memo
November 2016

QUESTION 8/VRAAG 8

8.1.1   C ✓
8.1.2   A ✓
8.1.3   B ✓   (3)

8.2.1
- Keeping food warm
- Remote controls
- Optical fibres   ✓
- Animals like snakes which hunt
- Infrared scanners (for picking up heat)

Any ONE ✓/Enige een

- *Hou voedsel warm*
- *Afstandbeheerders*
- *Optiese vesels*
- *Sekere diere soos slange wat jag*
- *Infrarooi skandeerders (wat hitte optel)*   (1)

8.2.2
- Telephone OR satellite OR cellphone connections
- RADAR systems   ✓
- RADAR speed traps
- Microwave ovens

Any ONE ✓/Enige een

- *Telefoon- OF satelliet- OF selfoonkonneksies*
- *RADARstelsels*
- *RADARspoedlokvalstelsels*
- *Mikrogolfoonde*   (1)

8.3.1   X-ray ✓
       X-strale   (1)

8.3.2   X-ray has a <u>high frequency</u> OR (high) <u>penetration</u> into soft tissues of humans, ✓
but not bones.
X-strale het 'n <u>hoë frekwensie</u> OF sagte weefsel van mense (hoog)<u>indring</u>, maar nie been nie.   (1)

8.3.3   X-rays can:
- damage living tissue
- cause cancer

X-strale kan:
- *weefsel beskadig*
- *kanker veroorsaak*

Any ONE ✓/Enige een   (1)

8.4

OPTION/OPSIE 1	OPTION/OPSIE 2
$E = h\frac{c}{\lambda}$ ✓	$f = \frac{c}{\lambda}$
$= 6{,}63 \times 10^{-34}$ ✓ $\times \frac{3 \times 10^8}{3}$ ✓	$= \frac{3 \times 10^8}{3}$ ✓
$= 6{,}63 \times 10^{-26}$ J ✓	$= 1 \times 10^8$ Hz
	$E = hf$ ✓ (one mark for both equations/ een punt vir albei vergelykings)
	$= 6{,}63 \times 10^{-34} \times 1 \times 10^8$ ✓
	$= 6{,}63 \times 10^{-26}$ J ✓

(4)
[12]

1.7   B ✓✓   (2)

QUESTION 8/*VRAAG 8*

8.1   It can/*Dit kan*:
- travel through vacuum/*deur vakuum beweeg*
- travel at the speed of 3×10^8 m·s^{-1}/*beweeg teen 'n spoed van* 3×10^8 *m·s*$^{-1}$

It originates from accelerating (oscillating) charges
Dit onstaan van versnelde (ossillerende) ladings
It propagates as electric and magnetic fields perpendicular to each other.
Dit beweeg voort as elektriese en magnetiese velde reghoekig tot mekaar
They can be/*Hulle kan*
- Reflected/*Weerkaats word*
- Refracted/*Breking ondergaan*

They undergo/*Hulle ondergaan*

Any two/*Enige twee*

- Inteference/*Interferensie*
- Diffraction/*Diffraksie*   (2)

8.2   Gamma rays/*Gammastrale*✓   (1)

8.3 $E = hf$ ✓
$$\underline{1{,}99 \times 10^{-20}} = (6{,}63 \times 10^{-34})(f) ✓$$
$$f = 3{,}0 \times 10^{13} \text{ Hz } ✓$$
Infra red radiation /*Infrarooistraling*✓   (4)

8.4.1   Radio waves/*Radiogolwe*✓   (1)

8.4.2   Infra red/*Infrarooi*✓   (1)

8.4.3   X-rays/*X-strale* ✓   (1)
                                                                [10]