education

DEPARTMENT: EDUCATION
MPUMALANGA PROVINCE



GERT SIBANDE DISTRICT

ERMELO SUB DISTRICT

GRADE 10

PHYSICAL SCIENCES

SEPTEMBER 2022

MARKING GUIDELINES

MARKS: 100

This marking guidelines consists of 6 pages

QUESTION 1

1.1 B✓✓ (2)

1.1 C✓✓ (2)

1.3 C✓✓ (2)

1.4 A✓✓ (2)

1.5 D✓✓ (2)

1.6 B✓✓ (2)

1.7 C✓✓ (2)

1.8 A✓✓ (2)

[18]

QUESTION 2

2.1 The total energy of an isolated system remains constant.✓✓ (2)
[2 or 0 mk]

2.2.1 $Ep = mgh$ ✓
$= (5)(9,8)(5)$ ✓
$= 24,5\ J$ ✓ (3)

2.2.2 $EM_{(O)} = EM_{(P)}$ /✓ $(Ep + Ek)O = (Ep + Ek)P$
OR: $mgh_{(O)} + ½mv_{2(O)} = mgh_{(P)} + ½mv_{2(P)}$
$(5)(9,8)(5) + 0 =$✓ $0 + ½(5)\ V_2$✓
$V = 9,90\ m.s^{-1}$✓ (4)

2.2.3 **POSITIVE MARKING FROM Q 2.2.2**
$vf^2 = vi^2 + 2a\Delta x$✓
$(0)^2 =$✓ $(9,90)^2 + 2a(3)$✓
$a = -16,34\ m{\cdot}s^{-2}$
$a = 16,34 m{\cdot}s{-}2$ in opposite to direction of motion✓ (4)

2.3 Mechanical/kinetic energy converted to heat/sound/internal energy.✓ (1)

[14]

QUESTION 3

3.1 (Destructive) interference.✓ (1)

3.2 Principle of superposition.
The algebraic sum of the amplitudes of two pulses that occupy the same space at the same time.✓✓**[2 or 0 mk]** (3)



3.3.1 The maximum disturbance of the particle from its rest (equilibrium) position.✓✓ **[2 or 0 mk]** (2)

3.3.2 8-6✓ = 2cm✓ (2)
[8]

QUESTION 4

4.1.1 Wave length.✓ (1)

4.1.2 A and C✓ (1)

4.1.3 B✓/D (1)

4.1.4 A✓/C/E (1)

4.2 2✓ (1)

4.3 3,5 m✓✓ (2)

4.4 The number of wave pulses per second.✓✓ (2)

4.5.1 $f = \frac{1}{T}$✓



$f = \frac{1}{3}$✓

f = 0,333 Hz✓ (3)

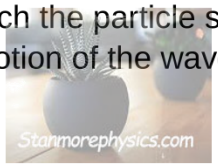
4.5.2

OPTION 1	**OPTION 2**
V = fλ ✓	Δx = VΔt✓
V = 0.333x2✓	2 = VX3✓
V = 0,67 $m.s^{-1}$✓	V = 0,67 $m.s^{-1}$✓

(3)
[15]

QUESTION 5

5.1 A wave in which the particle sof the medium vibrate parallel to the direction of motion of the wave.✓✓ (2)



5.2.1 Rarefaction✓ (1)

5.2.2 compression✓ (1)

5.3 The particle moves to the left and right✓✓
OR; The particle moves backwards and forwards (then return to its original position). (2)

5.4 2✓ (1)

5.5.1 OUT OF PHASE✓ (1)

5.5.2 IN PHASE✓ (1)

5.6 They are separated by a whole number of (complete) wavelengths.✓✓ (2)

5.7 f = number of oscillations per second
f = 410 ÷ 2✓
f = 205 Hz✓ (2)
[13]

QUESTION 6

6.1.1 PHYSICAL CHANGE✓ (1)

6.1.2 Molecules become disorderly arranged ✓due to breaking of intermolecular forces.✓ (2)

6.2.1 New chemical substances are formed.✓
OR: Mass and atoms are conserved , but the number of molecules is not. (1)

6.2.2 $CaCO_3$ (s) + 2HCl (aq) → $CaCl_2$ (aq) + CO_2 (g) + H_2O (l)

Criteria for marking Q 6.2.2	
Correct reactants	✓
Correct product	✓
Balancing	✓
All states are correct	✓

(4)

6.2.3 $2H_2O_2$ (aq) → O_2 (g) + $2H_2O$ (l)
2(1x2+16x2)✓ = (16x2) + 2(1x2 +16)✓
68 = 68✓ (3)

6.3.1 (ii)✓ (1)

6.3.2 (i)✓ (1)
[13]

QUESTION 7

7.1.1 $n(Zn) = \frac{m}{M}$✓

$n(Zn) = \frac{1,4}{65}$✓ = 0,022 mol

$n(Zn) = nH_2 = 1:1$

nH_2 = 0,022 mol

$n(H_2) = \frac{v}{Vm}$

$0,022 = \frac{v}{22,4}$✓

$V(H_2)$ = 0,493 dm^3✓ (4)

7.1.2 $n(Zn) = nZnCl_2 = 1:1$

$nZnCl_2$ = 0,022 mol✓

$m(ZnCl_2) = nM$

$m(ZnCl_2)$ = 0,022 X 136✓

$m(ZnCl_2)$ = 2,99 g✓ (3)



7.1.3 % yield = $\frac{\text{actual yield}}{\text{theoretical yield}} x\ 100$✓

% yield = $\frac{2,69}{2,99}$x100✓

% yield = 89,97 %✓ (3)

7.2 $Na_2CO_3.xH_2O$ = 268

23x2+12+16x3 + 18x✓ = 268✓

106 + 18X = 268

X = 9✓ (3)

7.3.1 The simplest whole-number ratio of atoms in a compound.✓✓ (2)

7.3.2

Element	C	H	Cl
$n = \frac{m}{M}$ ✓	$\frac{24,27}{12}$ = 2,0225	$\frac{4,07}{1}$ = 4,07	$\frac{71,65}{35,5}$ ✓ = 2,0183 ✓
Divide by smallest	$\frac{2,0225}{2,0185}$ = 1	$\frac{4,07}{2,0183}$ = 2	$\frac{2,0183}{2,0183}$ ✓ = 1 ✓
Empirical formula:		CH_2Cl ✓	

(6)
[21]

TOTAL: 100