KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE



GRADE 10

PHYSICAL SCIENCES

COMMON TEST

SEPTEMBER 2022

MARKING GUIDELINE

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MARKS: 100

TIME: 2 hours

This marking guideline consists of 8 pages.

QUESTION 1: MULTIPLE- CHOICE

1.1 D ✓✓ (2)

1.2 B ✓✓ (2)

1.3 C ✓✓ (2)

1.4 C ✓✓ (2)

1.5 B ✓✓ (2)

1.6 D ✓✓ (2)

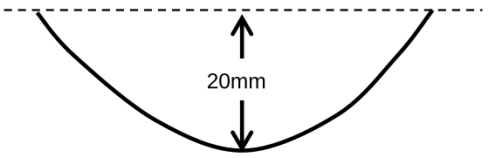
1.7 C ✓✓ (2)

[14]

QUESTION 2

2.1.1
- when two waves occupy the same space at the same time✓
- the resultant displacement is the algebraic sum of the two waves ✓ (2)

2.1.2



- ✓✓ for shape (trough)
- ✓ 20mm correctly indicated

(3)

2.1.3 Destructive✓ (1)

2.1.4
- <u>same displacement</u> from the rest position✓
- both <u>moving in</u> the <u>same direction at the same time</u> ✓ (2)

2.1.5 $f = \frac{1}{T}$ ✓

$= \frac{1}{1,8}$ ✓

$= 0,56\,Hz$ ✓



(3)

2.1.6 1,75 wavelengths✓ = 280 mm✓
1 wavelength = 160mm ✓ OR 0,16m (3)

2.1.7 POSITIVE MARKING FROM 2.1.5 AND 2.1.6

v = f x λ ✓

= 0,56 x 0,16✓

= 0,09 $m.s^{-1}$✓

(3)

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line

2.2

2.2.1 PARALLEL TO ✓ (1)

2.2.2 To ensure that particles of the medium vibrate along the medium ✓
OR do not vibrate perpendicular medium of the wave (1)

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2.2.3

$2waves: 5s$ ✓

$1wave: x$ ✓

$x = \frac{5}{2}$

$= 2{,}55$ s ✓

(3)

2.2.4 MOVES TO THE LEFT ✓ (1)
[23]

QUESTION 3

3.1 A sound wave that is reflected off a surface✓✓ (2)

3.2 **OPTION 1**:
The distance covered in 3 s = ($2x - 300$)m

$v = \frac{D}{\Delta t}$ ✓

$340 = \frac{2x-300}{3}$ ✓✓

$x = 660\,m$ ✓

$distance = (660 - 300)$ ✓

$= 360\,m$

OPTION 2:
Δt for sound to travel from position 1 to position 2:

$v = \frac{D}{\Delta t}$ ✓

$340 = \frac{300}{\Delta t}$ ✓✓

Δt = 0,882 s

Δt for sound to travel from position 2 to obstacle = $\frac{3 - 0{,}882}{2} = 1{,}059$ s ✓

Distance = vΔt = 340 x 1,059 ✓

= 360 m (5)

OPTION 3:
Distance covered= 300 + 2d✓

$v = \frac{D}{\Delta t}$ ✓

$340 = \frac{(300 + 2d)}{3}$ ✓✓

$D = 360\ m$ ✓

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3.3.1 1 (cm)✓ ✓ (2)

3.3.2 0,8(s) ✓✓ (2)

3.3.3
- pitch is inversely proportional to period ✓
- therefore when the pitch is halved then the period will double ✓ (2)

3.4 20 000 – 100 000 Hz ✓ (1)
[14]

QUESTION 4

4.1.1 Ag ✓ (1)

4.1.2 Solid ✓ (1)

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4.1.3 O_2 ✓ (1)

4.1.4 Water ✓ or dihydrogen oxide (1)

4.1.5 II ✓ (1)

4.1.6 I ✓ (1)

4.2.1 $3KBr + Fe(OH)_3 \rightarrow 3\,KOH + FeBr_3$
- ✓ for reactants
- ✓ for products
- ✓ for Balanced Equation (3)

4.2.2 148 g✓ (1)

4.2.3 REMAIN THE SAME ✓ (1)

4.2.4
- According to the law of conservation of mass ✓
- The total mass of the reactants must equal the total mass of the products. ✓✓ (3)

[14]

QUESTION 5

5.1.
- one mole of any substance✓
- contains 6,02 x 10^{23} particles ✓ (2)

5.2
$\frac{m}{n} = \frac{N}{N_A}$ ✓

$\frac{9,8}{98}$ ✓$= \frac{N}{6,02 \times 10^{23}}$ ✓

$N = 6,02 \times 10^{22} \underline{molecules} of\ H_2SO_4$

$=$ 4 x 6,02 x 10^{22} atoms of oxygen ✓

$= 2,41$ x10^{23} atoms✓

OR

$n = \frac{m}{M}$

$= \frac{9,8}{98}$ ✓

✓ for BOTH $n = \frac{m}{M}$ and $n = \frac{m}{M}$

$= 0,1\ mol$

$n = \frac{N}{N_A}$ ✓

$0,1 = \frac{N}{6,02 \times 10^{23}}$ ✓ ✓

$N = 6,02 \times 10^{22} \underline{molecules} of\ H_2SO_4$

= 4 x 6,02 x 10^{22} atoms of oxygen✓

= 2,41 x10^{23} atoms✓ (5)

5.3.1 REMAINS THE SAME ✓ (1)

5.3.2 The law of constant composition ✓ (1)

5.4.1
- The number of moles of dissolved solute ✓
- Per dm^3 of solution ✓ (2)

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5.4.2

$$c = \frac{m}{MV} \quad \checkmark$$

$$0,22 = \frac{4,4}{40 \times V} \quad \checkmark \checkmark$$

$$V = 0,5\,dm^3 \quad \checkmark$$

OR ✓ for BOTH $n = \frac{m}{M}$ and $c = \frac{n}{V}$

$$n = \frac{n}{M}$$

$$= \frac{4,4}{40} \quad \checkmark$$

$$= 0,11 mol.$$

$$c = \frac{n}{V}$$

$$0,22 = \frac{0,11}{V} \quad \checkmark$$

$$V = 0,5 dm^3 \quad \checkmark$$

(4)
[15]

QUESTION 6

6.1

- The amount of water molecules which is present ✓
- In one formula unit of salt ✓

(2)

6.2

$$For\,H_2O: n = \frac{m}{M}$$

$$= \frac{44,72}{18} \quad \checkmark$$

$$= 2,48 mol \cdot$$

$$for\,AlCl_3: n = \frac{55,28}{133,50} \quad \checkmark$$

$$= 0,41 mol$$

$$Ratio\,of\,AlCl_3 : H_2O$$

$$= 0,41 : 2,48 \quad \checkmark$$

$$= \frac{0,41}{0,41} : \frac{2,48}{0,41} \quad \checkmark$$

$$= 1 \quad : 6$$

$$Therefore\ n_{H_2O} = 6 \quad \checkmark$$

(5)

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6.3 **POSITIVE MARKING FROM QUESTION 6.2**

$$\%H = \frac{6(1\times 2)}{27+(35,5\times 3)+6(18)}\times 100$$

$$= \frac{12}{241,50}\times 100 \quad \checkmark \checkmark$$

$$= 4,97\% \quad \checkmark$$

(3)

[10]

QUESTION 7

7.1 $For\, Ca(OH)_2 : n = \frac{m}{M}$

$$= \frac{5,6}{74} \quad \checkmark$$

$$= 0,08\, mol \quad \checkmark$$

$$NH_4Cl : Ca(OH)_2$$

$$= \quad 2:1$$

$$Therefore\, n_{NH_4CL} = 0,16\, mol \quad \checkmark$$

(3)

7.2 POSITIVE MARKING FROM 7.1

$$NH_4Cl : NH_3$$
$$= 2:2$$
$$= \ 1:1$$

$$For\ NH_3 : n\ \frac{V}{Vm} \quad \checkmark$$

$$0,16 = \frac{V}{22,4} \quad \checkmark \checkmark$$

$$V = 3,58\, dm^3 \quad \checkmark$$

(4)

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7.3 **POSITIVE MARKING FROM QUESTION 7.2**

$$\%yield = \frac{actual\ \ yield}{theoritical\ \ yield} \times 100 \checkmark$$

$$= \frac{2,90}{3,58} \times 100 \checkmark$$



$$= 80,92\% \checkmark$$

(3)
[10]

TOTAL MARKS: 100

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