

PHYSICAL SCIENCES

GRADE : 10

TIME : 1 hour

TOTAL : 75

INSTRUCTIONS AND INFORMATION

1. Write your full name on your answer book in the appropriate place.
2. The question paper consists of SEVEN questions. Answer all the questions in your answer book.
3. QUESTION 5.4 MUST BE ANSWERED ON THE GRAPH PAPER SUPPLIED.
3. You may use a non-programmable calculator.
4. You may use appropriate mathematical instrument.
5. A DATA sheet and PERIODIC table are attached to your question paper. YOU ARE ADVISED TO MAKE USE OF BOTH.
6. Answer the questions correctly using the numbering system of the question paper.
7. PLEASE write neatly and legible.
8. Be brief in your motivations, discussions, et cetera.

QUESTION 1 : MULTIPLE CHOICE QUESTIONS

Four options are given as possible answers to the following questions. Each question has only ONE correct answer. Write down only the LETTER (A - D) next to the question number (1.1 - 1.5).

1.1 Which one of the following is a *mixture*?

- A) distilled water.
- B) copper chloride.
- C) graphite.
- D) the atmosphere. (2)

1.2 Which of ONE of the following four elements has the most *metallic properties*?

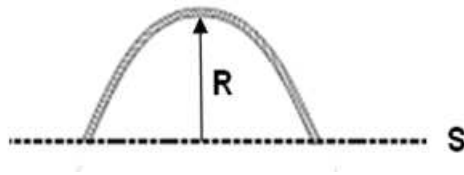
The atomic numbers of the elements are listed below.

- A) 12
- B) 14
- C) 16
- D) 17 (2)

1.3 Which ONE of the following is associated with *molecules*?

- A) K
- B) $C_{12}H_{22}O_{11}$
- C) $KMnO_4$
- D) CH_3COONa (2)

1.4 A pulse is shown in the diagram below. **R** and **S** are two unknown points.



Which ONE of the following combinations are the correct labels for **R** and **S**? (2)

	R	S
A	amplitude	equilibrium
B	amplitude	crest
C	equilibrium	amplitude
D	equilibrium	crest

1.5 How many complete wavelengths in terms of λ are shown in the diagram below?



- A) 2λ
 - B) λ
 - C) $1/2 \lambda$
 - D) $1/4 \lambda$
- (2)

[10]

QUESTION 2

The table below shows the boiling points of substances found in the laboratory.

Substance	Melting point (°C)	Boiling point (°C)
Ethanol	-117	78
Copper	1 086	1187
Nitrogen	-210	-196
Sunflower oil	-17	230
Potassium chloride	772	1500
Carbon dioxide	-78	-57

2.1 What is meant by the term *boiling point*? (2)

Write down:

2.2 the name of the substance which melts at the lowest temperature. (1)

2.3 the names of *two* elements which are solids at room temperature (20°C) but is a liquid at 1000°C. (2)

2.4 name of the substance that is a liquid over the widest temperature range? (1)

2.5 temperature that carbon dioxide changes from a solid to a liquid? (1)

[7]

QUESTION 3

3.1 The chemical formula of a compound tells us *two* things about the compounds chemical composition. Name these two things. (2)

3.2 Write down the *formula* for the following

3.2.1 chlorate ion (1)

3.2.2 dichromate ion (1)

3.3 *Name* for the following

3.3.1 SO_4^{2-} (1)

3.3.2 MnO_4^{2-} (1)

[6]

QUESTION 4

The table below contains various substances. Use the substances in the table to answer the following questions.

SiO ₂	Na
NaCl	CO ₂
Si	

Write down the substance/s that is associated with:

- 4.1 ionic bonding (1)
- 4.2 covalent molecular structures (1)
- 4.3 delocalized electron cloud (1)
- 4.4 giant repeating lattices of covalently bonded atoms (1)
- 4.5 Metalloids (1)
- 4.5.1 Explain the term metalloid. (2)
- 4.5.2 Write down ONE property make a metalloid different from metals and explain the difference? (2)

For the element **Na**

- 4.6 Represent the element in the notation ${}^A_Z\text{E}$. (2)
- 4.7 Write down the spectroscopic electron configuration notation. (2)
- 4.8 Draw Lewis dot diagram for the element. (2)

[15]

QUESTION 5

Learners took some crushed ice from a freezer and left it in the class to melt in a glass beaker. The learners decided to take the temperature of the crushed ice as it melted. They took the temperature every 3 minutes. The temperature of the classroom was kept constant.

The results they obtained are represented in the table below. Use the data in the table to answer the following questions.

Time(minutes)	0	3	6	9	12	15	18	21	24	27
Temperature (°C)	-9	-5	-1	0	0	0	5	7	14	24

- 5.1 Define the term *temperature*. (2)
- 5.2 Name the instrument that the learners used to measure the temperature. (1)
- 5.3 Identify the:
- 5.3.1 independent (1)
 - 5.3.1 dependant variable (1)
 - 5.3.3 controlled variable (1)
- 5.4 Draw an accurate fully labelled graph that represents the data in the table. (5)
- 5.5 What was the temperature inside the freezer where the ice came from? (2)
- 5.6 What is happening to the ice at the temperature between 9 to 15 minutes?
Explain you answer. (3)

[16]

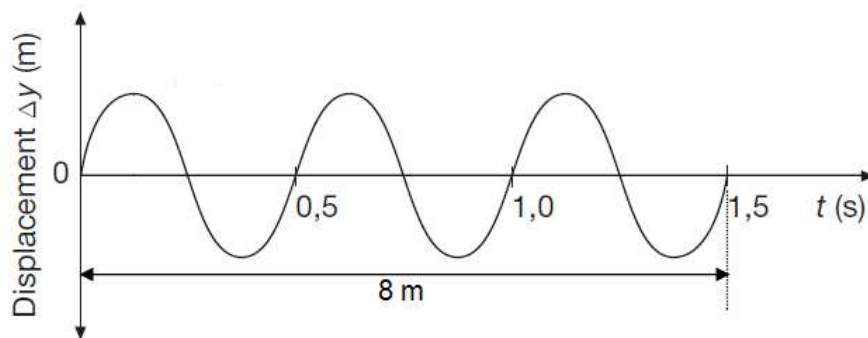
QUESTION 6

- 6.1 Define *constructive interference*. (2)
- 6.2 Define the *principle of superposition*. (2)
- 6.2 Use diagrams to demonstrate *constructive interference*. (5)
Clearly show *before, during and after*.

[09]

QUESTION SEVEN

7. The diagram below is for a wave. The questions that follow are based on the diagram.



- 7.1 Name the type of wave represented. (Write only TRANVERSE or LONGITUDINAL.) (1)
- 7.2 Determine the wavelength of the wave. (2)
- 7.3 Define the term *frequency*. (2)
- 7.4 Determine the *frequency* of the wave (2)
- 7.5 Calculate the speed of the wave. (3)
- 7.6 The frequency of this wave is *doubled*.
Redraw the pattern in your answer-book of the wave that will be observed in the **0.5 s** time interval. (2)

[12]

SECTION A = 10
SECTION B = 65
TOTAL = 75

DATA

WAVES, SOUND AND LIGHT/GOLWE, KLANK EN LIG

$v = f \lambda$	$T = \frac{1}{f}$
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TABLE 3: THE PERIODIC TABLE OF ELEMENTS/TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
1 2,1 H																	2 He 4
3 1,0 Li	4 1,5 Be											5 2,0 B	6 2,5 C	7 3,0 N	8 3,5 O	9 4,0 F	10 Ne 20
11 0,9 Na	12 1,2 Mg											13 1,5 Al	14 1,8 Si	15 2,1 P	16 2,5 S	17 3,0 Cl	18 Ar 40
19 0,8 K	20 1,0 Ca	21 1,3 Sc	22 1,5 Ti	23 1,6 V	24 1,6 Cr	25 1,5 Mn	26 1,8 Fe	27 1,8 Co	28 1,8 Ni	29 1,9 Cu	30 1,6 Zn	31 1,6 Ga	32 1,8 Ge	33 2,0 As	34 2,4 Se	35 2,8 Br	36 Kr 84
37 0,8 Rb	38 1,0 Sr	39 1,2 Y	40 1,4 Zr	41 Nb 92	42 1,8 Mo	43 1,9 Tc	44 2,2 Ru	45 2,2 Rh	46 2,2 Pd	47 1,9 Ag	48 1,7 Cd	49 1,7 In	50 1,8 Sn	51 1,9 Sb	52 2,1 Te	53 2,5 I	54 Xe 131
55 0,7 Cs	56 0,9 Ba	57 La 139	72 1,6 Hf	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 1,8 Tl	82 1,8 Pb	83 1,9 Bi	84 2,0 Po	85 2,5 At	86 Rn
87 0,7 Fr	88 0,9 Ra 226	89 Ac															
			58 Ce 140	59 Pr 141	60 Nd 144	61 Pm	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175	
			90 Th 232	91 Pa	92 U 238	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	

KEY/SLEUTEL

Atomic number
Atoomgetal

Electronegativity
Elektronegatiwiteit

Symbol
Simbool

Approximate relative atomic mass
Benaderde relatiewe atoommassa

