



TSHWANE WEST DISTRICT(D15)

SOSHANGUVE CLUSTER

PHIYSICAL SCIENCES

GRADE 10 **CONTROLLED TEST** **(SEPTEMBER 2025)**

Total: 100 marks

TIME: 2hours

Examiner: PHALATSE GM

MODERATOR: TEMBE SS

This question paper consists of 14 pages including a formular sheet and a periodic table.

INSTRUCTION

1. This question paper consists of TWO sections, **ANSWER ALL SECTIONS:**
Section A (Physics): 75 marks.
Section B (Chemistry): 25 marks
2. Section A five questions and section B has four questions
3. Write your full NAME and SURNAME in the appropriate space on the ANSWER BOOK.
4. Start EACH question on a NEW page.
5. Number the answers correctly according to the numbering system used in this question paper.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments.
8. Show ALL formulae and substitutions in ALL calculations.
9. Round off your FINAL numerical answers to a minimum of TWO decimal places.
10. Give brief motivations, discussions, et cetera where required.
11. You are advised to use the attached DATA SHEETS.
12. Write neatly and legibly.

PART A
PHYSICS

Total: 75 marks

QUESTION 1

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the CORRECT ANSWER and write only the letter (A – D) next to the question numbers (1.1 to 1.5) in the ANSWER BOOK, e.g. 1.6 C.

1.1 Which of the following is a scalar quantity

- A Velocity
- B Displacement
- C Speed
- D Force

(2)

1.2 The displacement of 2 m east, 5 m west and 9 m east is...

- A 16 m east
- B 16 m west
- C 6 m east
- D 6 m west

(2)

1.3 4 Km h^{-1} is the same as _____ ms^{-1}

- A 1.11 ms^{-1}
- B 2.22 ms^{-1}
- C 3.33 ms^{-1}
- D 4.44 ms^{-1}

(2)

1.4 The graph underneath the velocity vs time graph is the

- A Displacement
- B Time
- C Acceleration
- D Energy

(2)

1.5 The SI unit for energy is

- A Newtons
- B Watts
- C Joules
- D Amperes

(2)

[10]

QUESTION 2

2.1 Define the term vector (2)

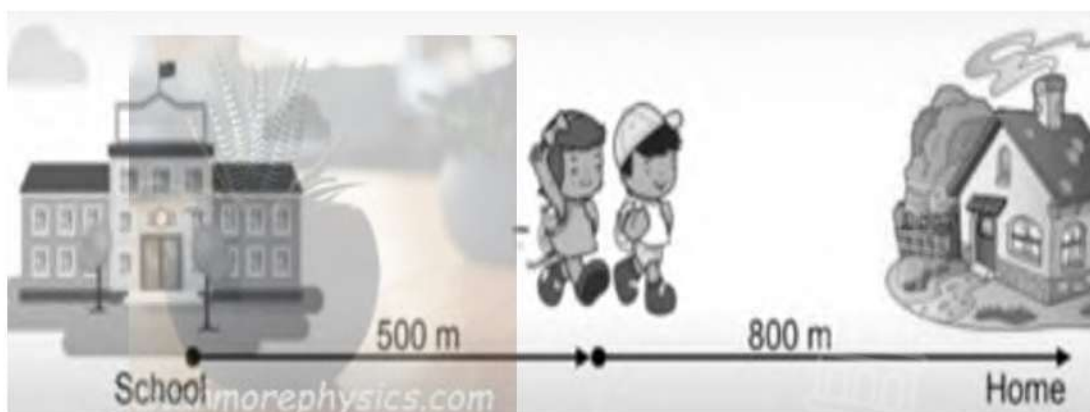
2.2 Three forces are acting on a box. Force F_1 of magnitude 50N and force F_2 of magnitude 70N are acting in the easterly direction where else force F_3 with a magnitude of 40N acts in a westerly direction as shown in the diagram below.



2.2.1. Define the term resultant force. (2)

2.2.2. Determine the resultant force acting on the box **GRAPHICALLY** using tail to head method. Use a scale of 1cm:10N (5)

2.3 Use the below diagram to answer questions about reference point

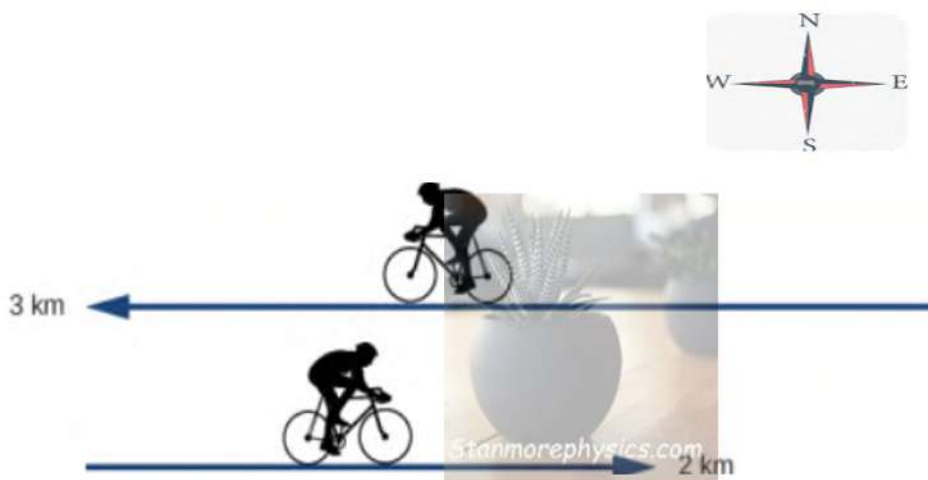


2.3.1 What is the position of the school relative to the home (2)

[11]

QUESTION 3

- 3.1 Distinguish between distance and displacement and give example of each (4)
- 3.2 A cyclist is preparing himself for the upcoming competition. He started by moving 3km west and turning back as shown below. Use the information below about the cyclist to answer questions that follow:



- 3.2.1. Calculate the total distance covered by the cyclist (2)
- 3.2.2. Calculate the displacement of the cyclist. (2)
- 3.3 If the cyclist covered the first 3 km in 20 minutes and the last 2km in 18 minutes, calculate his: average velocity in $m.s^{-1}$ (5)
- 3.4 The cyclist sees a cat standing 500m ahead of him as he is travelling east at of $48 m.s^{-1}$. He immediately applies the brakes. It takes 20s for a bicycle to stop.
- 3.4.1 Will the cyclist be able to stop before hitting a cat? Use calculations to support your answer. (5)

[18]

QUESTION 4

The velocity vs time graph below represents the motion of motorbike over a period of 18s. The motorbike initially moves NORTH.



- 4.1 Define the term velocity. (2)
- 4.2 What is the magnitude of motorbike's velocity at the beginning of the motion? (1)
- 4.3 Calculate Motorbike's distance from time 0s to time 18s of its journey **WITHOUT USING EQUATIONS OF MOTION.** (7)
- 4.4 Indicate the time interval/s when motorbike's is:
 - 4.4.1 Slowing down (1)
 - 4.4.2 Having zero acceleration (2)

- 4.4.3 Decelerating (2)
- 4.4.4 Moving in the opposite direction of the initial motion (1)
- 4.5 Define the term acceleration. (2)
- 4.6.1 Calculate the acceleration at time 2s to 4s (3)
- 4.6.2 Write down the acceleration at time 13s? (1)
- 4.7 Draw a graph of acceleration vs time for her motion from $t=0\text{s}$ to $t=8\text{s}$.
Use a **GRAPH SHEET given** to draw the graph. (6)
- 4.8. How will the acceleration at 16s to 18s compare with acceleration at 14s to 16? Write down only **MORE THAN, LESS OR EQUAL TO**. Explain your answer. (2)

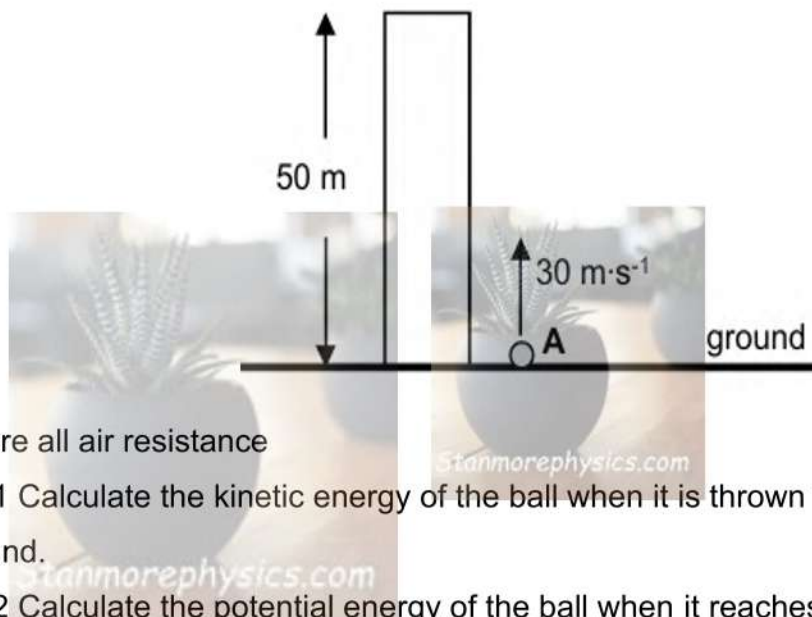
[30]

QUESTION 5

5.1 Define kinetic energy

(2)

5.2 Ball A of mass 0.5 Kg is thrown vertically upwards with a velocity of 30ms^{-1}



Ignore all air resistance

5.2.1 Calculate the kinetic energy of the ball when it is thrown from the ground.

(3)

5.2.2 Calculate the potential energy of the ball when it reaches the top of the building 50m above the ground.

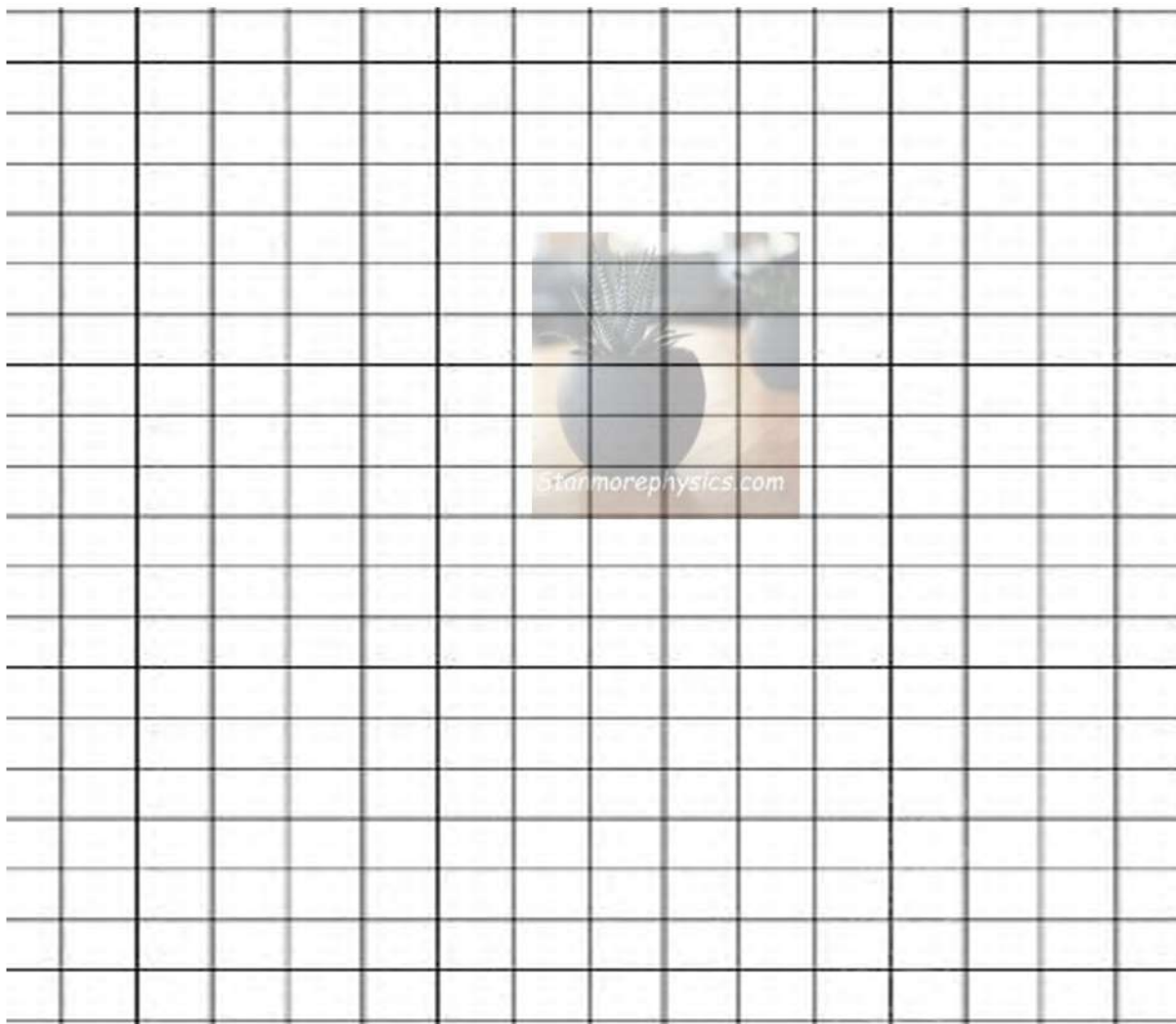
(3)

[8]

Learner's name: _____

Question 4

4.7 _____



[5]

TABLE 1: PHYSICAL CONSTANTS/TABEL 1: FISIIESE KONSTANTES

NAME/NAAM	SYMBOL/SIMBOOL	VALUE/WAARDE
Acceleration due to gravity <i>Swaartekragversnelling</i>	g	$9,8 \text{ m}\cdot\text{s}^{-2}$
Universal gravitational constant <i>Universele gravitasiekonstante</i>	G	$6,67 \times 10^{-11} \text{ N}\cdot\text{m}^2\cdot\text{kg}^{-2}$
Radius of the Earth <i>Radius van die Aarde</i>	R_E	$6,38 \times 10^6 \text{ m}$
Mass of the Earth <i>Massa van die Aarde</i>	M_E	$5,98 \times 10^{24} \text{ kg}$
Speed of light in a vacuum <i>Spoeid van lig in 'n vakuum</i>	c	$3,0 \times 10^8 \text{ m}\cdot\text{s}^{-1}$
Planck's constant <i>Planck se konstante</i>	h	$6,63 \times 10^{-34} \text{ J}\cdot\text{s}$
Coulomb's constant <i>Coulomb se konstante</i>	k	$9,0 \times 10^9 \text{ N}\cdot\text{m}^2\cdot\text{C}^{-2}$
Charge on electron <i>Lading op elektron</i>	e	$-1,6 \times 10^{-19} \text{ C}$
Electron mass <i>Elektronmassa</i>	m_e	$9,11 \times 10^{-31} \text{ kg}$

MOTION/BEWEGING

$v_f = v_i + a \Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$ or/of $\Delta y = v_i \Delta t + \frac{1}{2} a \Delta t^2$
$v_f^2 = v_i^2 + 2a \Delta x$ or/of $v_f^2 = v_i^2 + 2a \Delta y$	$\Delta x = \left(\frac{v_i + v_f}{2} \right) \Delta t$ or/of $\Delta y = \left(\frac{v_i + v_f}{2} \right) \Delta t$

WORK, ENERGY AND POWER/ARBEID, ENERGIE EN DRYWING

$W = F \Delta x \cos \theta$	$U = mgh$ or/of $E_p = mgh$
$K = \frac{1}{2}mv^2$ or/of $E_k = \frac{1}{2}mv^2$	$W_{\text{net}} = \Delta K$ or/of $W_{\text{net}} = \Delta E_k$ $\Delta K = K_f - K_i$ or/of $\Delta E_k = E_{kf} - E_{ki}$
$W_{\text{nc}} = \Delta K + \Delta U$ or/of $W_{\text{nc}} = \Delta E_k + \Delta E_p$	$P = \frac{W}{\Delta t}$
$P_{\text{ave}} = F v_{\text{ave}}$ / $P_{\text{gemid}} = F v_{\text{gemid}}$	

Part B

Chemistry

Total marks :25

QUESTION 1

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the answer and write only the letter (A – D) next to the question numbers (1.1 to 1.8) in the ANSWER BOOK, e.g. 1.9 E.

1.1 The simplest whole number ratio of atoms in a compound is called the :

- A The empirical formular
- B Molecular formular
- C Molar mass
- D Atomic mass

(2)

1.2 The percentage composition of oxygen in H_2O is

- A 50%
- B 25%
- C 89%
- D 100%

(2)

[4]

QUESTION 2

2.1 Define the term concentration.

(2)

2.2 3 mol of NaCl is made to dissolve in a $2dm^3$ container filled with water.

2.2.1. calculate the concentration of NaCl in the solution.

(3)

[5]

QUESTION 3

3.1 Define one mole

(2)

3.2 Calculate the number of moles (n) of water of crystallisation of hydrated copper chloride ($CuSO_4 \cdot n H_2O$) if the percentage by mass of $CuSO_4$ is 74,7% and for water is 25,3%

(5)

[7]

QUESTION 4

- 4.1 Hlomphanang learners conducted an experiment to determine the % yield of CaCl_2 produced when 2g of CaCO_3 was made to react with excess HCl.

Use the following equation to answer the following questions:



- 4.1.1. Balance the above equation. (2)

- 4.1.2 Calculate the number of moles of CaCO_3 present (3)

- 4.1.2. Determine the % yield of CaCl_2 if 1.8 g of CaCl_2 was obtained. (4)

[9]





**DATA FOR PHYSICAL SCIENCES GRADE 12
PAPER 2 (CHEMISTRY)**

**GEGEWENS VIR FISIIESE WETENSKAPPE GRAAD 12
VRAESTEL 2 (CHEMIE)**

TABLE 1: PHYSICAL CONSTANTS / TABEL 1: FISIIESE KONSTANTES

NAME / NAAM	SYMBOL / SIMBOOL	VALUE / WAARDE
Standard pressure <i>Standaarddruk</i>	p^θ	$1,013 \times 10^5 \text{ Pa}$
Molar gas volume at STP <i>Molêre gasvolume by STD</i>	V_m	$22,4 \text{ dm}^3 \cdot \text{mol}^{-1}$
Standard temperature <i>Standaardtemperatuur</i>	T^θ	273 K
Charge on electron <i>Lading op elektron</i>	e	$-1,6 \times 10^{-19} \text{ C}$
Avogadro's constant <i>Avogadro-konstante</i>	N_A	$6,02 \times 10^{23} \text{ mol}^{-1}$

TABLE 2: FORMULAE / TABEL 2: FORMULES

$n = \frac{m}{M}$	$n = \frac{N}{N_A}$
$c = \frac{n}{V}$ OR/OF $c = \frac{m}{MV}$	$n = \frac{V}{V_m}$

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)
2,1 1 H 1	1,0 3 Li 7	1,5 4 Be 9										2,0 5 B 11	2,5 6 C 12	3,0 7 N 14	3,5 8 O 16	4,0 9 F 19	2 He 4
0,9 11 Na 23	1,2 12 Mg 24											1,5 13 Al 27	1,8 14 Si 28	2,1 15 P 31	2,5 16 S 32	3,0 17 Cl 35,5	18 Ar 40
0,8 19 K 39	1,0 20 Ca 40	1,3 21 Sc 45	1,5 22 Ti 48	1,6 23 V 51	1,6 24 Cr 52	1,5 25 Mn 55	1,8 26 Fe 56	1,8 27 Co 59	1,8 28 Ni 59	1,9 29 Cu 63,5	1,6 30 Zn 65	1,6 31 Ga 70	1,8 32 Ge 73	2,0 33 As 75	2,4 34 Se 79	2,8 35 Br 80	36 Kr 84
0,8 37 Rb 86	1,0 38 Sr 88	1,2 39 Y 89	1,4 40 Zr 91	1,6 41 Nb 92	1,8 42 Mo 96	1,9 43 Tc 98	2,2 44 Ru 101	2,2 45 Rh 103	2,2 46 Pd 106	1,9 47 Ag 108	1,7 48 Cd 112	1,7 49 In 115	1,8 50 Sn 119	1,9 51 Sb 122	2,1 52 Te 128	2,5 53 I 127	54 Xe 131
0,7 55 Cs 133	0,9 56 Ba 137	1,6 57 La 139	1,6 72 Hf 179	1,6 73 Ta 181	1,6 74 W 184	1,6 75 Re 186	1,6 76 Os 190	1,6 77 Ir 192	1,6 78 Pt 195	1,6 79 Au 197	1,6 80 Hg 201	1,8 81 Tl 204	1,8 82 Pb 207	1,9 83 Bi 209	2,0 84 Po 209	2,5 85 At 210	86 Rn 222
0,7 87 Fr 227	0,9 88 Ra 226	89 Ac															
58 Ce 140	59 Pr 141	60 Nd 144	61 Pm 147	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 231	92 U 238	93 Np 237	94 Pu 244	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259	103 Lr 262				

KEY/SLEUTEL

Electronegativity
Elektronegatiwiteit

Atomic number
Atoomgetal

Symbol
Simbool

Approximate relative atomic mass
Benaderde relatiewe atoommassa