KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA



NATIONAL SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES

COMMON TEST

SEPTEMBER 2022

MARKING GUIDELINE

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NB: This marking guideline consists of 7 pages.

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QUESTION ONE

1.1 D ✓✓
1.2 A✓✓
1.3 D ✓✓
1.4 B✓✓
1.5 C✓✓
1.6 D✓✓ **[12]**

QUESTION TWO

2.1 The magnitude of the induced emf across the ends of a conductor is directly proportional to the rate of change in the magnetic flux linkage with the conductor. ✓✓ (2)

2.2 North / N ✓✓ (2)

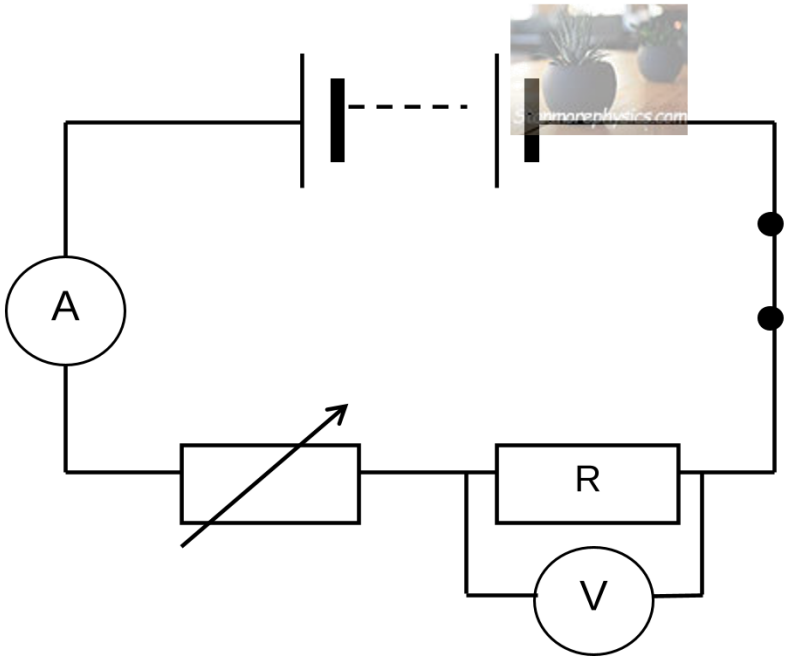
2.3 Positive marking from Question 2.2
North✓✓ (2)

[6]

QUESTION 3

3.1 The potential difference across a conductor is directly proportional to the current in the conductor ✓at constant temperature. ✓ (2)

3.2



Marking Rubric

No	Criteria	Mark
1	All components included in diagram	1
2.	Ammeter connected in series to resistor R	1
3.	Voltmeter connected in parallel to R	1
4.	All components are connected correctly.	1

(4)

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3.3.1 Directly proportional✓ (1)

3.3.2 No✓,the line is not drawn through the average of the plotted points. ✓ (2)

3.4.3 $\frac{1}{R} = \frac{\Delta I}{\Delta V}$

$= \frac{2-0}{1-0}$ ✓

R = 0,5 Ω ✓ (2)

3.4.4 Power✓✓ (2)

[13]

QUESTION 4

4.1.1 V= I·R ✓ = 1,25 x 3 ✓= 3,75 V✓ (3)

Positive marking from question 4.1.1

4.1.2 $R = \frac{V}{I}$

$10 = \frac{3,75}{I}$ ✓

I = 0,375 A✓ (2)

4.2.1 $Q = I\Delta t$ ✓

$1200 = I \cdot 300$ ✓

$I = 4\ A$ ✓ (3)

4.2.2 **Positive marking from Question 4.1 and 4.2**

$I_R = 4 - (1,25+0,375)$ ✓

$= 2,375$ A

$R = \frac{V}{I}$

$R = \frac{3,75}{2,375}$ ✓

$= 1,58\ \Omega / 1,579\ \Omega$ ✓ (4)

4.2.3 V= I·R

= 4 x 3,5✓

= 14 V

EMF = 14 + 3,75✓

= 17,75 V✓ (3)

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4.3.1 2200 J of energy is dissipated by the iron per second✓✓ (2)

4.3.2 $P = \frac{V^2}{R}$ ✓

$2200 = \frac{230^2}{R}$ ✓

$R = 24{,}045\ \Omega$

$W = \frac{V^2}{R}\Delta t$ ✓

$= \frac{220^2}{24{,}045}(1800)$ ✓

= 3,62 x10^6 J✓ (5)

4.3.3 Energy used in kWh : 3,62 x10^6 J = 1,01 kWh ✓

1 kWh costs R 2,56

Cost of using the iron =1,01 x 2,56✓

= R 2,59 ✓ (3)

[25]

QUESTION 5

5.1 Boyles Law✓ (3)

The volume of an enclosed mass of gas is inversely proportional to the pressure exerted by the gas when the temperature remains constant.✓✓

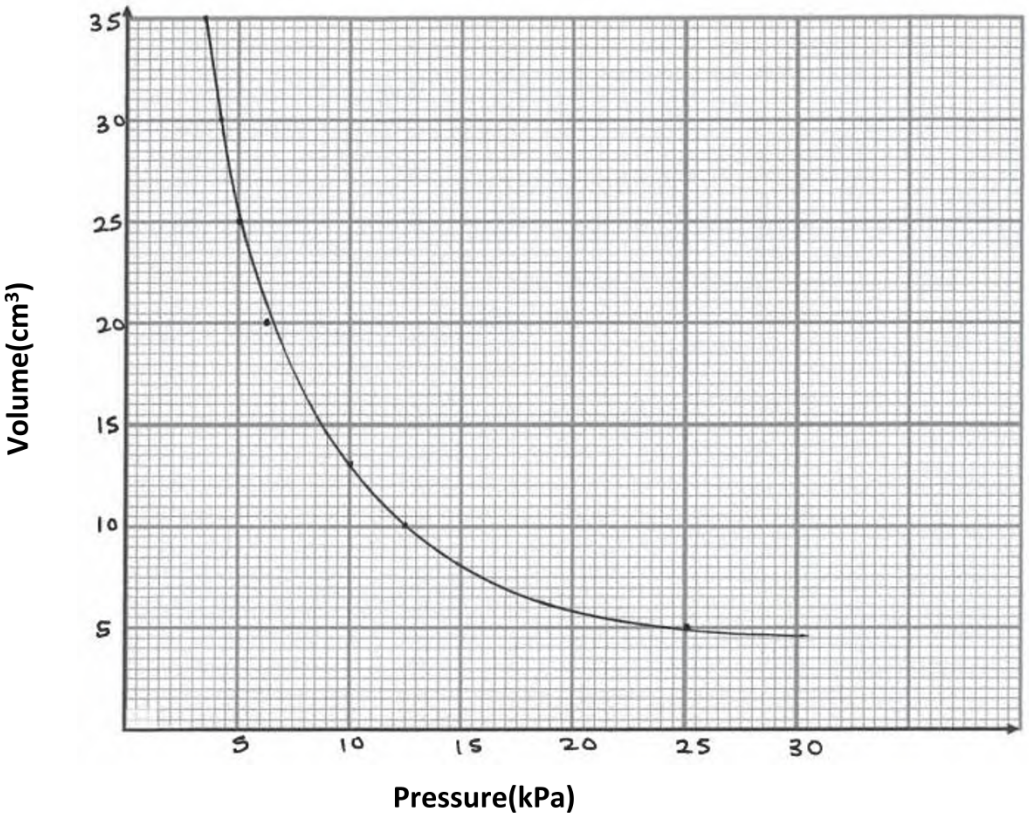
5.2 What is the relationship between volume and pressure for a fixed mass of gas.✓✓ (2)

Marking criteria:

- Identifying the two variables (pressure and volume).
- Correctly phrased as a question.

5.3 Temperature (of the gas)✓

5.4 Graph of Volume vs Pressure



Marking Rubric

No	Criteria	Mark
1	All points correctly plotted -1 if more than 2 points plotted incorrectly	2
2	Volume on y-axis and Pressure on x-axis	1
3	Line of best fit curve drawn	1

(4)

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5.5 Pressure x Volume
= $N.m^{-2}$ ✓ x m^3 ✓
= N.m
= J ✓ (3)

5.6 At very high pressure, the gas becomes less compressible. ✓
The volume occupied by the gas is so small that intermolecular distance between the molecules decreases.✓Thus an attractive force is observed between molecules and gas may become a liquid.✓ (3)

5.7 $P_1V_1 = P_2V_2$ ✓

$(3.5)(35) = (P_2)(45)$ ✓ (3)

$P_2 = 2{,}72\ cm^3$ ✓

[19]

QUESTION 6

6.1 The minimum energy needed for a reaction to take place.✓✓ (2)

6.2.1 56 kJ✓ (1)

6.2.2 36 kJ✓ (1)

6.2.3 $\Delta H = E_{products} - E_{reactants}$
= 36 -10 ✓
= +26 kJ✓ (2)

6.3 Cold pack✓
Energy is absorbed./ Reaction is endothermic/ $\Delta H > 0$✓ (2)

6.4 Substance that speeds up the reaction✓ by decreasing the activation energy.✓ (2)

6.5 No effect ✓ (1)

[11]

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QUESTION 7

7.1.1 It is a proton donor. ✓✓ (2)

7.1.2 Is a substance that can act as an acid or a base. ✓✓ (2)

7.1.3 $H_2PO_4^-$ ✓ and HPO_4^{2-} ✓ (2)

7.1.4 $H_2PO_4^-$ and HPO_4^{2-} ✓✓ (2)
or H_2O and H_3O^+

7.2.1 $CH_3COOH + NaOH$ ✓ ⟶ $CH_3COONa + H_2O$ ✓ ✓bal (3)

7.2.2 $2HCl + CaCO_3$ ✓ ⟶ $CaCl_2 + CO_2 + H_2O$ ✓ ✓bal (3)

[14]

TOTAL MARKS: 100



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