

education

**MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA**

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

**PHYSICAL SCIENCES: TOPIC TEST
ENERGY AND CHANGE
2026**

MARKS: 10

TIME: 12 min

This question paper consists of 6 pages including data sheets

INSTRUCTIONS AND INFORMATION

1. Write your name in the appropriate space on your FOLIO PAPER.
2. This question paper consists of 2 QUESTIONS. Answer all the questions in the FOLIO PAPER.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Leave ONE line between two sub-questions, for example between QUESTION 2.1 and QUESTION 2.2.
5. You may use a non-programmable calculator.
6. You may use appropriate mathematical instruments.
7. Show ALL formulae and substitutions in ALL calculations.
8. Round off your final numerical answers to a minimum of TWO decimal places.
9. Give brief motivations, discussions, etc. where required.
10. Write neatly and legibly.

QUESTION 1: MULTIPLE CHOICE QUESTIONS

Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.1 to 1.2) in the FOLIO PAPER, for example 1.3 E.

1.1 Which ONE of the following statements CORRECTLY describes the characteristics of an endothermic reaction?

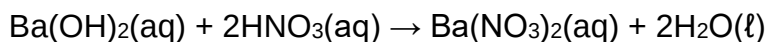
- A ΔH is positive and the products have less potential energy than the reactants
- B ΔH is positive and the products have more potential energy than the reactants.
- C ΔH is negative and the products have less potential energy than the reactants.
- D ΔH is negative and the products have more potential energy than the reactants.

(2)

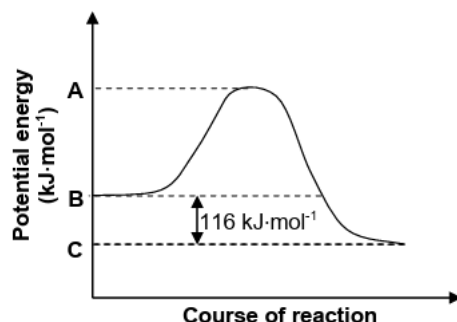
[2]

QUESTION 2 (Start on a new page.)

A barium hydroxide solution, $\text{Ba}(\text{OH})_2(\text{aq})$, reacts with a nitric acid solution, $\text{HNO}_3(\text{aq})$, according to the following balanced equation



The potential energy graph below shows the change in potential energy for this reaction.



- 2.1 Is this reaction ENDOTHERMIC or EXOTHERMIC? Give a reason for the answer. (2)
- 2.2 Use energy values A, B and C indicated on the graph and write down an expression for each of the following:
- 2.2.1 The energy of the activated complex (1)
- 2.1.3 The activation energy for the forward reaction (1)
- 2.1.4 ΔH for the reverse reaction (1)
- 2.4 Calculate the amount of energy released during the reaction if 0,18 moles of $\text{Ba}(\text{OH})_2(\text{aq})$ reacts completely with the acid. (3)
- [8]

TOTAL: [10]

**DATA FOR PHYSICAL SCIENCES GRADE 11
PAPER 2 (CHEMISTRY)**

**GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 11
VRAESTEL 2 (CHEMIE)**

TABLE 1: PHYSICAL CONSTANTS/TABEL 1: FISIESE KONSTANTES

NAME/NAAM	SYMBOL/SIMBOOL	VALUE/WAARDE
Avogadro's constant <i>Avogadro-konstante</i>	N_A	$6,02 \times 10^{23} \text{ mol}^{-1}$
Molar gas constant <i>Molêre gaskonstante</i>	R	$8,31 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$
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

TABLE 2: FORMULAE/TABEL 2: FORMULES

$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$	$pV = nRT$
$n = \frac{m}{M}$	$n = \frac{N}{N_A}$
$n = \frac{V}{V_m}$	$c = \frac{n}{V}$ OR/OF $c = \frac{m}{MV}$

