



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

ENVIRONMENTAL HEALTH

**SUBJECT: Physical Science for Environmental PAPER NO: 605/23/M12
Health Technicians**

DURATION: 3 hours

NOVEMBER/DECEMBER 2025 EXAMINATION

REQUIREMENTS

- 1) Non programmable scientific calculator.
- 2) Periodic table

INSTRUCTIONS TO CANDIDATE

- 1) Answer any five (5) questions.
- 2) Do not write your name on the answer booklet.

This paper consists of 4 printed pages.

QUESTION 1

- a) Explain the difference between the following:
- i) Speed and acceleration (2 marks)
 - ii) Vector and scalar (2 marks)
 - iii) Mass and weight (2 marks)
 - iv) Alkane and alkene (2 marks)
 - v) Suspension and solute (2 marks)
- b) Balance the following equations:
- i) $Na_2O + H_2O \longrightarrow NaOH$ (3 marks)
 - ii) $PCl_3 + H_2O \longrightarrow H_3PO_3 + HCl$ (3 marks)
 - iii) $Na + Cl_2 \longrightarrow NaCl$ (2 marks)
 - iv) $H_2 + N_2 \longrightarrow NH_3$ (2 marks)

QUESTION 2

- a) i) Explain the term "hard water". (2 marks)
- ii) Outline the undesirable effects of using hard water. (8 marks)
- b) Draw the dot and cross diagram for the following and identify the type of bonding in each:
- i) Carbon dioxide. (5 marks)
 - ii) Calcium oxide (5 marks)

QUESTION 3

- a) Discuss the physical and chemical principles involved in water purification. (14 marks)
- b) Outline any four (4) properties of acids. (4 marks)
- c) Give two (2) uses of bases in hospitals. (2 marks)

QUESTION 4

- a) Discuss health problems associated with radiation exposure and suggest possible measures that can be put in place to reduce its impact on human health. (12 marks)
- b) i) Calculate the molecular mass of sucrose ($C_{12}H_{22}O_{11}$) (5 marks)
- ii) Calculate the number of moles contained in 5 grams of sucrose. (3 marks)

QUESTION 5

- a) Give the functional groups of the following organic compounds:
- i) alcohol (2 marks)
- ii) Aldehyde (2 marks)
- iii) Alkane (2 marks)
- iv) Alkene (2 marks)
- v) Carboxylic acid (2 marks)
- vi) Ester (2 marks)
- b) Acid rain is caused mainly by sulphur dioxide and oxides of nitrogen in the atmosphere. Show using balanced equations how acid rain is formed from sulphur dioxide and oxides of nitrogen. (6 marks)
- c) Outline any two (2) negative impacts, acid rain has on the environment. (2 marks)

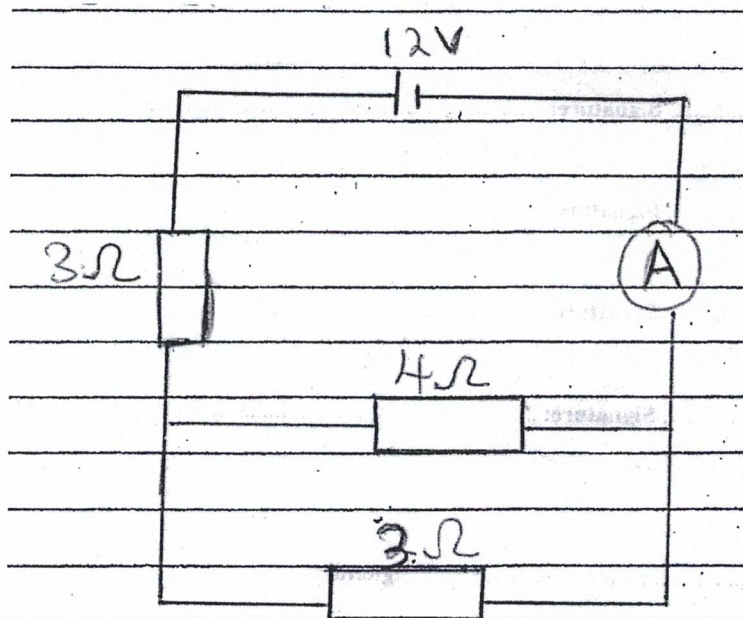
QUESTION 6

a) The diagram below shows an electric circuit.

i) Calculate the total resistance in the circuit. (4 marks)

ii) Calculate the current flowing through the ammeter marked A.

(3 marks)



b) A sprint cyclist starts from rest and accelerates at 1m/s^2 for 20 seconds. He then travels at a constant speed for 1 minute and finally decelerates at 2m/s^2 until he stops. Calculate the following:

i) Maximum speed in km/h. (4 marks)

ii) Total distance covered in metres. (9 marks)

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