



MARCH 2017
CO, KB, MH

ALEXANDER ROAD HIGH SCHOOL
PHYSICAL SCIENCE CONTROL TEST
GRADE 10

1 HOUR
TOTAL = 60

Instructions

- The question paper consists of 5 questions.
- Answer all the questions.
- Answer section A on the answer sheet provided AND section B on folio sheets.
- Rule off after each question in Section B.
- A non-programmable calculator may be used.
- Number the answers correctly according to the numbering system.
- Round off to two (2) decimal places where necessary.
- Formulas and a periodic table have been included at the end of the question paper

SECTION A

- Answer on the answer sheet -

QUESTION 1: Multiple choice

Four possible options are provided as answers to the following questions. Each question has only 1 correct answer. Choose the correct answer and write the letter (A – D) next to the relevant question number (1.1 – 1.6) on the answer sheet.

- 1.1 When the temperature of a substance stays constant, it means that
- A The substance is boiling.
 - B The substance is melting.
 - C The average kinetic energy of the particles of the substance are not changing.
 - D There is a phase change occurring in the substance.
- 1.2 Which of the following elements will have the lowest first ionisation energy?
- A Li
 - B F
 - C Ne
 - D O

1.3 The **volt** can be defined as:

- A the current strength when 1 joule of energy is transferred per 1 coulomb of charge
- B the potential difference when 1 coulomb of charge transfers 1 joule of energy
- C the unit of energy in a circuit
- D the unit for resistance of energy in a circuit

1.4 Units for current, voltage and resistance are:

	Current	Voltage	Resistance
A	A	$J.s^{-1}$	Ohm
B	I	V	R
C	$C.s^{-1}$	$A.\Omega^{-1}$	Ω
D	$C.s^{-1}$	V	$V.A^{-1}$

1.5 The wave form is moving left to right in the direction of the arrow.



How is the medium moving at the point marked, P?

- A ↓
- B ↑
- C ↙
- D →

1.6 Bats use the reflection of sound in order to navigate. If a bat produces a sound and hears the sound back after 0.4s, how far is the object away from the bat if the speed of sound is $343m.s^{-1}$.

- A 68,6m
- B 56,4m
- C 120m
- D 119,2m

[2 x 6 = 12]

SECTION B

QUESTION 2

Consider the compound magnesium chloride.

- 2.1 Draw the Aufbau-diagram for the magnesium-ion. (3)
- 2.2 Give the electron configuration (s,p-notation) for the chloride-ion. (2)
- 2.3.1 What type of bond forms when magnesium and chlorine react? (1)
- 2.3.2 Give a reason for your answer in 2.3.1. (1)
- 2.3.3 By using Lewis-diagrams, show how magnesium chloride is formed. (4)

[11]

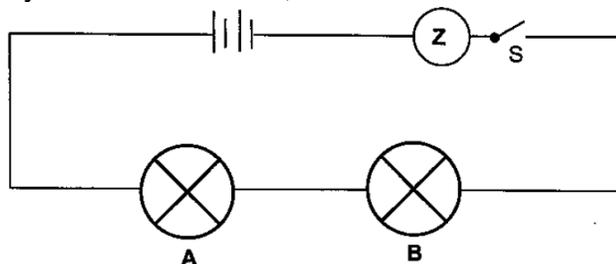
QUESTION 3

- 3.1 Define boiling point. (2)
- 3.2 Explain why water boils at a higher temperature in a pressure cooker than in a normal pot. (3)

[5]

QUESTION 4

- 4.1 The circuit below consists of two identical bulbs, A and B, a meter Z, and an open switch S. The battery consists of two 1,5 V cells.

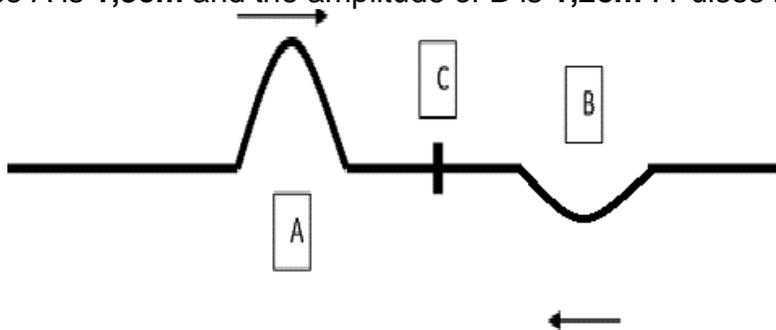


- 4.1 Which physical quantity can device Z measure when the switch is closed? (1)
- 4.2 Define the quantity in 4.1. (2)
- 4.3 Why are the bulbs shining with the same brightness? Give two reasons. (2)
- 4.4 If each bulb has a resistance of 2Ω , calculate the current strength in the circuit. (3)
- 4.5 If a similar bulb C is connected in the circuit in **parallel** with bulb A, calculate the:
- 4.5.1 total resistance in the circuit. (3)
- 4.5.2 potential difference across bulb A and C (4)
- 4.6 Will bulb B shine BRIGHTER, DIMMER or THE SAME when this third bulb is connected? (1)

[16]

QUESTION 5

5.1 Two pulses A and B move toward each other at the same speed. The amplitudes of pulse A is **1,8cm** and the amplitude of B is **1,2cm** . Pulses meet each other at point C



5.1.1 What is the name given to the type of interference that occurs at point C (1)

5.1.2 Make a labelled sketch to show what happens at point C. [make sure to indicate the amplitude of the resultant pulse (in cm)] (2)

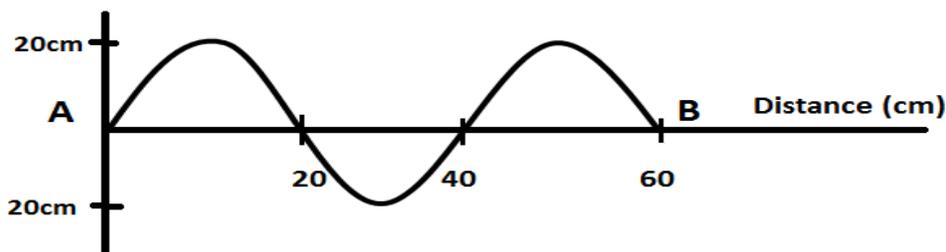
5.2 What is the difference between a transverse wave and a longitudinal wave? (as it relates to the displacement in a medium). (4)

5.3.1 A learner stands at the end of a long pier and watches as the waves move past the end of the pier. She notices that 90 waves move past the end of the pier every **3 minutes**. If the wavelength of the wave is 150cm calculate

5.3.1 the frequency of the wave. (2)

5.3.2 the speed of the wave. (3)

5.4 It take 3s for the wave shown below to move from A to B



5.4. Using the graph, find

5.4.1 the amplitude (1)

5.4.2 the wavelength (in m) (1)

5.4.3 the period (2)

[16]

TOTAL 60 MARKS

RELEVANT FORMULAS

Waves, sound and light

$$v = f \times \lambda \quad v = \lambda / T \quad T = 1 / f \quad f = 1 / T$$

Electricity and magnetism

$$I = Q / \Delta t \quad V = W / Q \quad R = V / I$$

$$R = r_1 + r_2 + r_3 + \dots \quad 1 / R = 1 / r_1 + 1 / r_2 + 1 / r_3 + \dots$$

$$R = \frac{r_1 \times r_2}{r_1 + r_2}$$