



education

Department of
Education
FREE STATE PROVINCE

GRADE 9

NATURAL SCIENCES

NOVEMBER 2017

MARKS: 100

TIME: 2 HOURS

This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consist of TWO sections and NINE questions.

SECTION A: 20 marks

SECTION B: 80 marks

2. Answer ALL questions in this question paper.
3. Number ALL your answers correctly according to the numbering system used in this question paper.
4. You may use a non-programmable calculator where necessary.
5. In case of calculations, show all steps.
6. Use a pencil for drawings and graphs.
7. Write neatly and legibly.

SECTION A

QUESTION 1

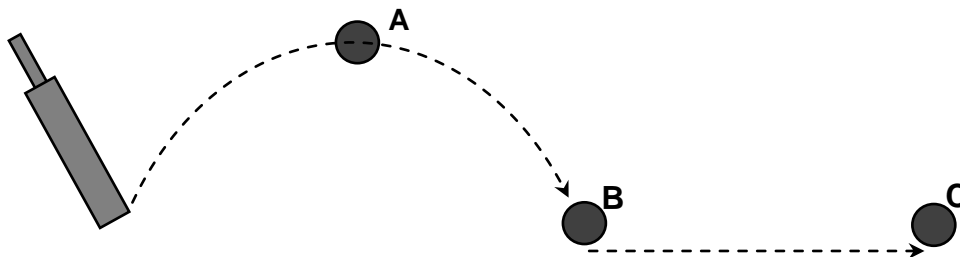
Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A – D) next to the question number (1.1 – 1.10) in the ANSWER BOOK.

1.1 The units in which force is measured:

- A Joules
- B Kilowatts
- C Newton
- D Kilograms

(1)

1.2 Study the diagram below. A cricket player hits a cricket ball with a bat. The ball passes point **A** in the air, lands on the ground at point **B** and rolls a distance before it comes to a stop at point **C**.



Identify the force that causes the ball to move from point **A** to point **B** as well as the force that causes the ball to come to a stop at point **C**.

	Force causing the ball to move from A to B	Force causing the ball to stop at C
A	Gravitational force	Gravitational force
B	Gravitational force	Frictional force
C	Frictional force	Gravitational force
D	The force of the bat on the ball	Frictional force

(1)

- 1.3 A lightweight conducting ball, **S**, hangs from a nylon thread. When a charged bar is brought close to **S**, it is repelled by the bar. Which ONE of the following best represents the charges on the bar and on **S**?

	CHARGE ON THE BAR	CHARGE ON S
A	Negative	Neutral
B	Positive	Neutral
C	Positive	Negative
D	Negative	Negative

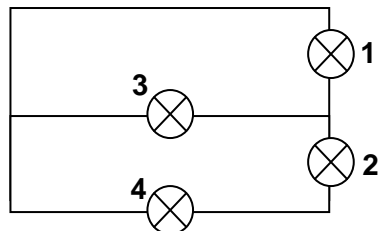
(1)

- 1.4 Daniel uses a piece of silk to rub a comb. The comb becomes positively charged. This net positive charge accumulated because the comb ...

- A gains protons.
- B gains electrons.
- C loses electrons.
- D loses protons.

(1)

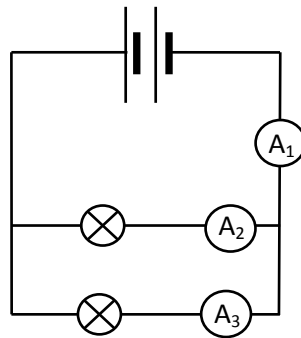
- 1.5 Which bulb(s) will keep on glowing if bulb **3** burns out?



- A Only bulbs **2** and **4** will glow.
- B No bulb will glow.
- C Only **1** and **4** will glow.
- D Bulbs **1**, **2** and **4** will glow.

(1)

- 1.6 Consider the circuit diagram below. The light bulbs are NOT necessarily identical.



The reading on A_2 will be equal to ...

- A the reading on A_1 .
B half the reading on A_1 .
C the reading on A_3 minus the reading on A_1 .
D the reading on A_1 minus the reading on A_3 . (1)
- 1.7 The outermost layer of Earth is called the ...
A mantle.
B core.
C crust.
D magma. (1)
- 1.8 The atmospheric layers in order, starting closest to the Earth are:
A Stratosphere, troposphere, mesosphere, thermosphere
B Troposphere, stratosphere, mesosphere, thermosphere
C Mesosphere, troposphere, thermosphere, stratosphere
D Thermosphere, stratosphere, mesosphere, troposphere (1)
- 1.9 Coal power stations release two gases that contribute to global warming. These two gases are ...
A N_2 and SO_2 .
B SO_2 and O_2 .
C CO_2 and N_2 .
D CO_2 and SO_2 . (1)

1.10 This gas forms 21% of the atmosphere and is essential for living organisms:

- A Ozone
- B Hydrogen
- C Oxygen
- D Carbon dioxide

(1)
[10]

QUESTION 2

Give ONE word/term for each of the following descriptions. Write ONLY the word/term next to the question number (2.1–2.5) in the ANSWER BOOK.

- 2.1 Friction, tension and compression are examples of ... (1)
- 2.2 The rate of flow of electric charges in a circuit. (1)
- 2.3 Devices that can increase or decrease electric voltage. (1)
- 2.4 A group of cells that are connected together. (1)
- 2.5 A component made of material that allows an electric current to flow through it. (1)

[5]

QUESTION 3

Choose an item from COLUMN B that matches a statement in COLUMN A. Write down only the letter (A–H) next to the question number (3.1–3.5) in the ANSWER BOOK.

COLUMN A	COLUMN B
3.1 Molten (liquid) rock which comes out of a volcano	A Marble
3.2 The earth's crust cracks and hot liquid rock and smoke is released	B Lithification
3.3 A metamorphic rock formed when limestone is changed by heat and pressure	C Lava
3.4 Molten (liquid) rock while it is still inside the earth	D Melt
3.5 Change from sediments to rock	E Volcano
	F Magma
	G Slate
	H Basalt

(5 × 1) [5]

TOTAL SECTION A: 20

SECTION B

QUESTION 4

Diagrams **A**, **B**, **C** and **D** below represent four metallic bars with its properties described next to each.

A	Iron bar & also a magnet
B	Iron bar, but NOT a magnet
C	Aluminum bar
D	Mixture of copper and nickel

4.1 Will bar **A** attract the following:

4.1.1 Bar **C**. Give a reason for your answer. (2)

4.1.2 BAR **B** or Bar **D**. Give a reason for your answer. (2)

4.2 Draw a diagram to illustrate the magnetic field around a single bar magnet. (3)

4.3 Learners perform an investigation to determine the charge on each of four objects, **Q**, **R**, **S** and **T**. They use a negative charge X and a neutral object P. They observe the following:

- Q attracts P
- R repels Q
- S attracts R, but repels T
- T attracts X

Copy the following table into the ANSWER BOOK and complete the table to show how you have identified each of these charges.

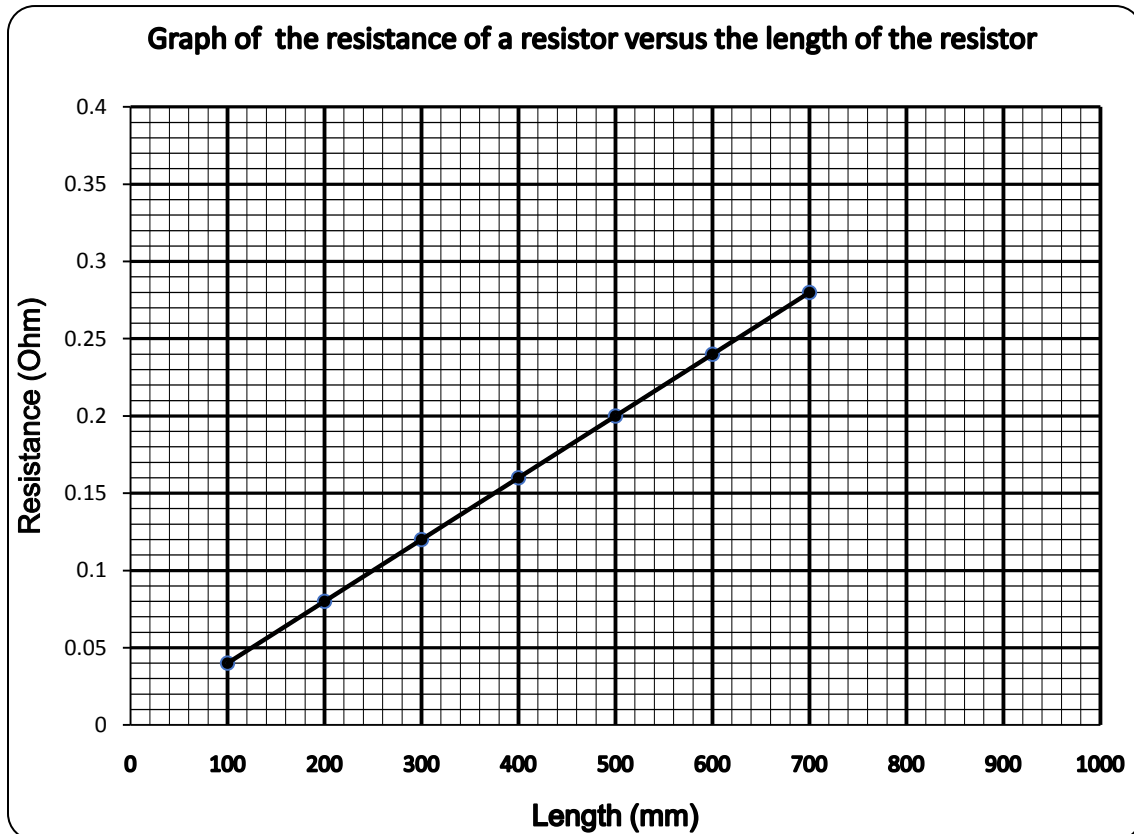
CHARGED OBJECT	CHARGE (POSITIVE OR NEGATIVE)
4.3.1 Q	
4.3.2 R	
4.3.3 S	
4.3.4 T	

(4)
[11]

QUESTION 5

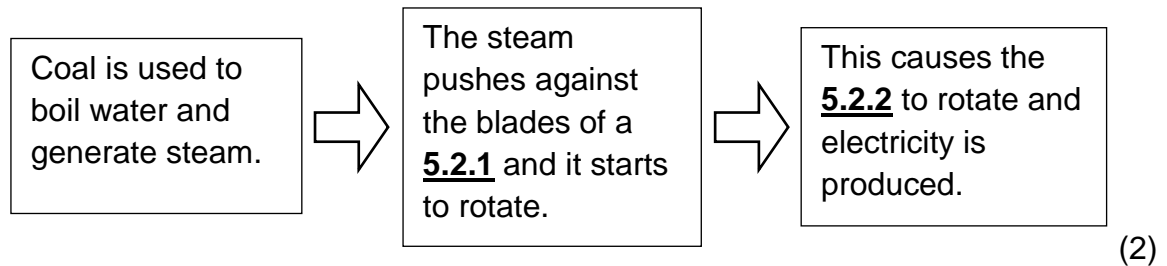
- 5.1 A group of grade 9 learners has conducted a practical investigation to determine how the length of a resistor affects the resistance of the resistor. The results of the investigation are shown in the graph below.

Use the graph to answer the questions that follow.

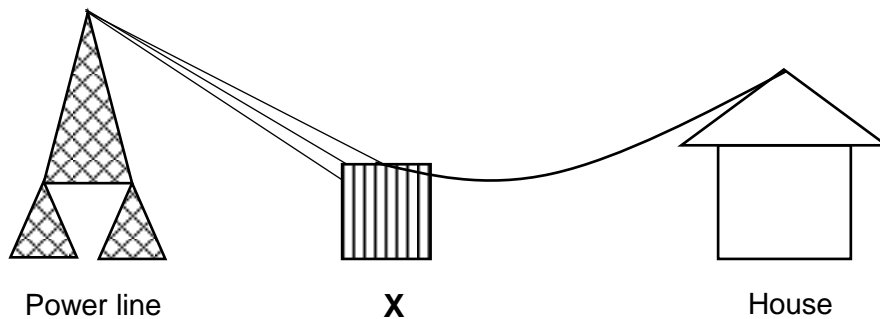


- 5.1.1 Formulate an investigative question for this investigation. (2)
- 5.1.2 Identify the independent variable. (1)
- 5.1.3 Identify the dependent variable. (1)
- 5.1.4 Write down the conclusion for this investigation. (2)
- 5.1.5 The length of the resistance wire is 200 mm. Use the graph and determine the resistance of the wire in ohm. (2)

- 5.2 Most power stations in South Africa use coal as a fuel. The flow diagram indicates a few steps in the production of electricity. Complete the flow diagram by writing down the number (5.2.1–5.2.2) and the correct term for the missing device.



- 5.3 Power lines carry electricity at very high voltages, e.g. 300 000 V. Household appliances need voltages between 220 V and 240 V.

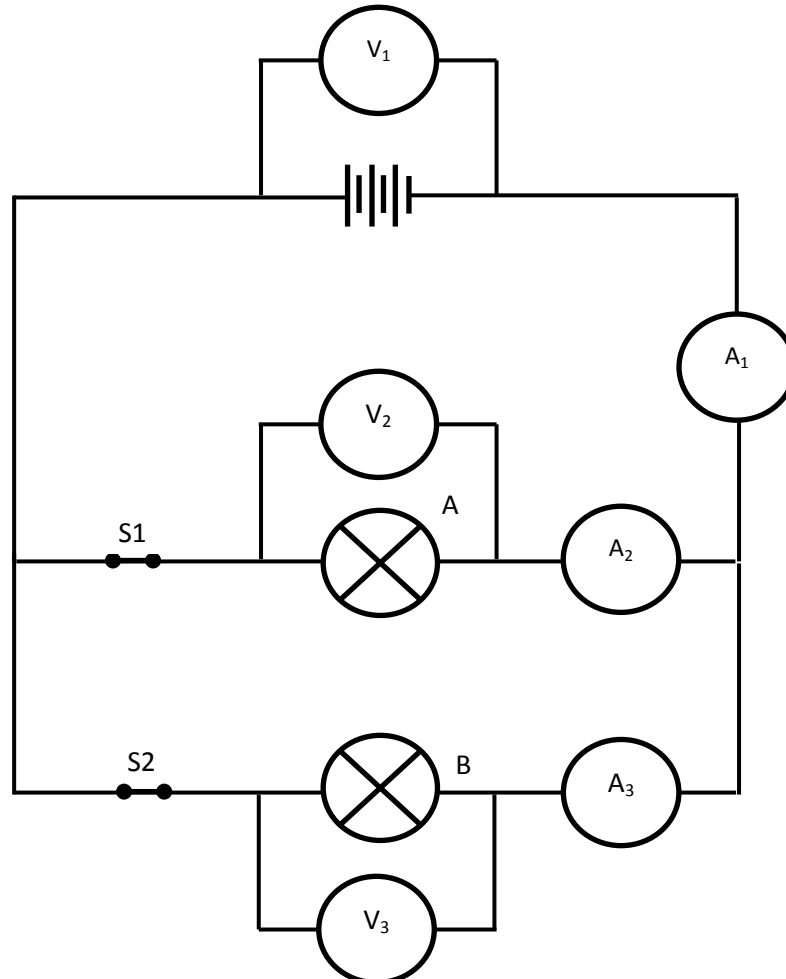


Identify **X** in the diagram and explain how it is used to solve the above-mentioned problem.

(3)
[13]

QUESTION 6

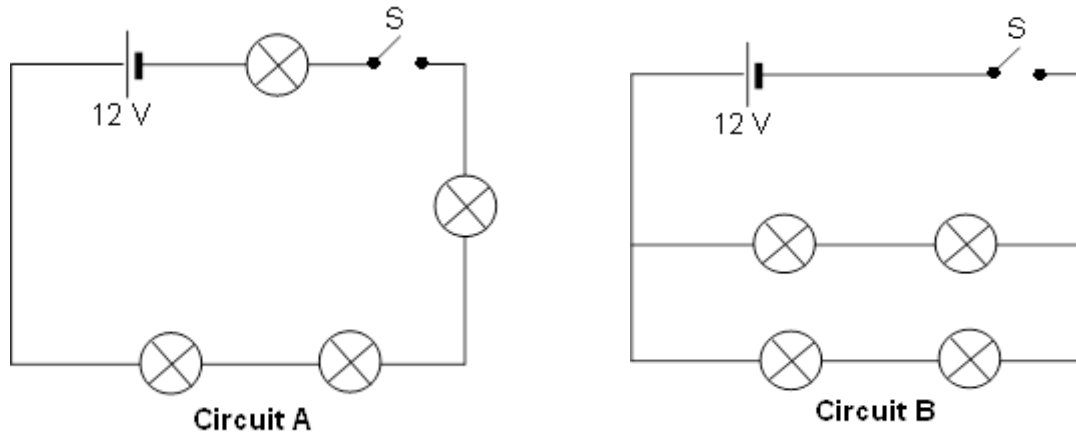
- 6.1 Study the circuit below and answer the questions that follow. V_1 reads 9V, and when both switches are closed A_1 reads 6A and $A_2 = 2A$.



- 6.1.1 What are the readings of V_2 and V_3 ? (1)
- 6.1.2 What would the reading on A_2 show if switch S_2 is opened? Give a reason for your answer. (3)
- 6.1.3 Which bulb, **A** or **B** has the higher resistance? Explain your answer. (2)

- 6.2 Two groups of learners investigate different types of circuits. Each group is given four identical bulbs and a 12 V battery.

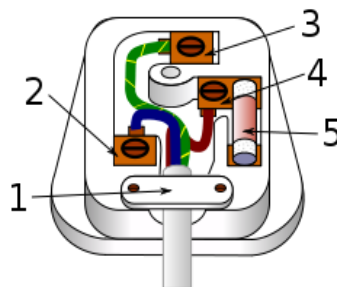
Group A builds circuit A. Group B builds circuit B.



The switch in each circuit is now **closed**.

- 6.2.1 In which circuit, **A** or **B**, will the light bulbs glow the brightest? (1)
- 6.2.2 Give a reason for your answer to QUESTION 6.2.1. (1)
- 6.2.3 One bulb burns out (fuses) in each of the circuit. Describe how circuit **A** and **B** will be affected. (2)
- 6.2.4 Which circuit (**A** or **B**) illustrates how the lights in a house are connected? (1)
- 6.2.5 Which circuit (**A** or **B**) illustrates how a string of christmas lights are connected, if it is observed that if one of the bulbs does make contact, the whole string dies out. (1)

- 6.3 Refer to the diagram of a three-pin plug below and answer the questions that follow.



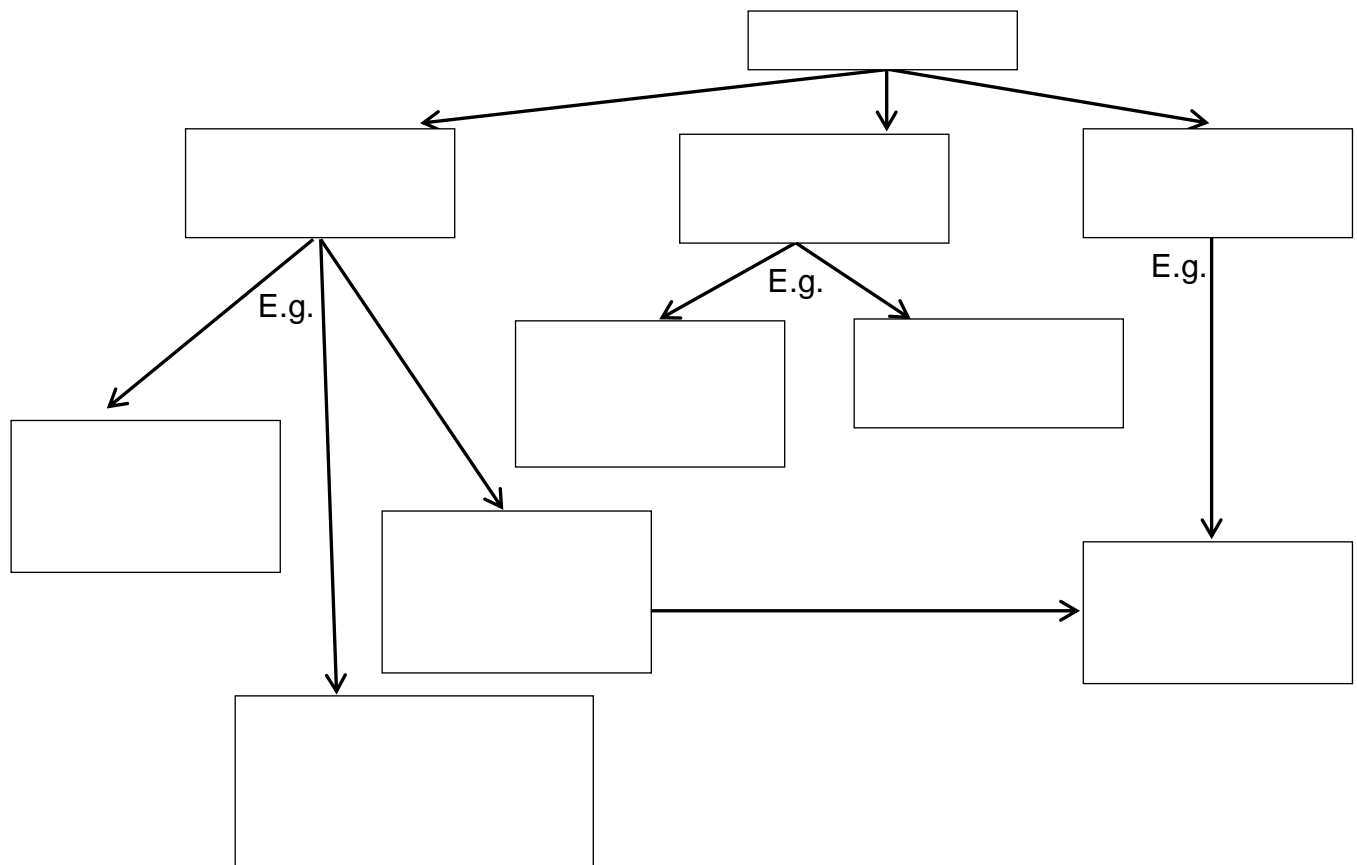
- 6.3.1 Label part **3** and **5** in the diagram. (2)
- 6.3.2 Explain the purpose of part **3** in an electrical appliance. (2)
- 6.4 To make a cup of coffee, water is boiled for 2 minutes in a kettle that uses 2 000 W.
- 6.4.1 Calculate the total energy consumption during the 2 minutes. (3)
- 6.4.2 Calculate the cost for the total energy consumption, if the unit price is 120 c. (3)
- 6.5 The cost of household electricity has escalated dramatically in the past decade. Make suggestions on how you can save on household electricity consumption and ultimately reduce cost. (3)
- [25]**

QUESTION 7

- 7.1 Earth can be understood as a complex system where all the parts (called spheres) interacts with each other. Name the FOUR spheres of the earth and give a short description of each. (8)
- 6.2 Give the correct term for each of the following descriptions concerning the layers of the Earth.
- 7.2.1 The layer of Earth that contains mostly liquid rock. (1)
- 7.2.2 Earth's thickest layer. High temperatures can soften this layer and cause it to change shape. (1)
- 7.2.3 This layer of Earth is solid due to tremendous pressure. (1)
- 7.2.4 Earth's thinnest layer. (1)
- [12]**

QUESTION 8

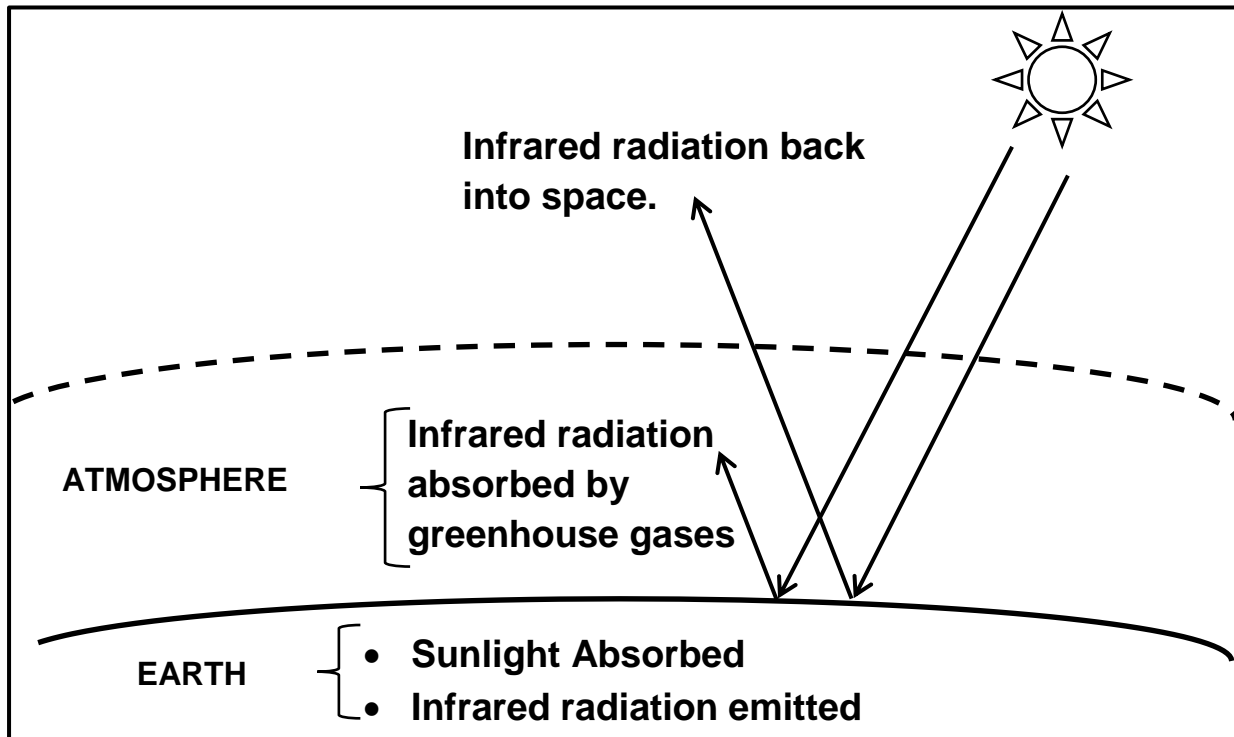
Provide the labels in the diagram shown below. Write down number (8.1–8.2) and the correct answer in your ANSWER BOOK.



(9 x 1) [9]

QUESTION 9

An increase in the average temperature of the atmosphere on Earth, was first detected by scientists in the 1980s. It is caused primarily by increased emissions of several gases into the atmosphere.



- 9.1 What is this phenomenon known as? (1)
- 9.2 Name the serious consequences that can be caused by global warming. (2)
- 9.3 Name THREE gases mainly responsible for this phenomenon. (3)
- 9.4 Give full description of how the greenhouse effect takes place. (4)
- [10]**

TOTAL SECTION B: 80
GRAND TOTAL: 100