



77018233



**EXAMINATIONS COUNCIL OF ZAMBIA
JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 9) – 2021**

**Integrated Science 502/1
Paper 1**

(INTERNAL CANDIDATES)

Time: 2 hours 30 minutes

Marks: 80

Instructions to Candidates

- 1** Pull out the inserted **Answer Booklet** from the question paper.
- 2** Write your **examination number, school/centre name and code** on the **Answer Sheet**.
- 3** Ensure that you **write** your **examination number** on **every page** of the Answer Booklet.
- 4** This paper consists of two Sections **A** and **B**. Answer **all** the questions in both sections of this paper.
- 5** Section **A**: for each question, **four** suggested answers **A, B, C** and **D** are given. Choose the best one and mark it on the answer grid provided in the Answer Booklet.
- 6** Section **B**: write all the answers in the spaces provided for section **B** in the Answer Booklet.
- 7** Hand in the Answer Booklet and the rest of the question paper separately.

Information for Candidates

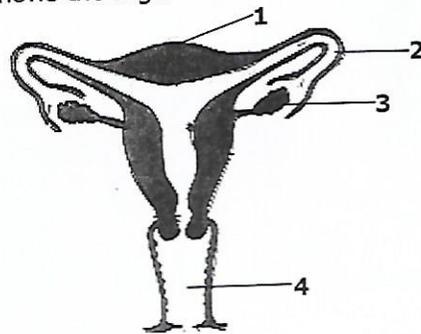
- 1** Cell phones are **not allowed** in the examination room.
- 2** Calculators are **not allowed** in the examination room.

<https://downloads.gidemy.com>

SECTION A (20 Marks)

Answer **all** questions. Mark your answers with a **cross (X)** on the Answer Grid provided in the Answer Booklet.

- 1 Which of the following is **not** a way of observing personal hygiene of the reproductive organs in both males and females?
 - A Changing sanitary towels regularly during menstruation.
 - B Changing underwear regularly and ironing them before use.
 - C Visiting the health centre each time there is an infection on the reproductive organs.
 - D Washing of the reproductive organs to avoid bad smell.
- 2 The following diagram shows the organs in the female reproductive system.



Which numbered part shows the organ where the process of implantation of the zygote occurs?

- A 1
- B 2
- C 3
- D 4

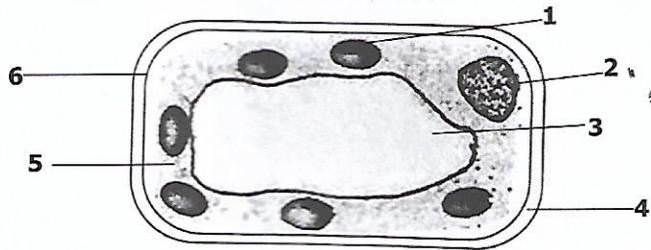
- 3 The following table shows symptoms and nutritional deficiency diseases.

	Symptom	Nutritional deficiency disease
1	Poor vision at night	Kwashiorkor
2	Swollen stomach and thin limbs	Marasmus
3	Poor healing of wounds	Rickets
4	Unhealthy bones and teeth	Scurvy

Which pair correctly shows the symptom and corresponding nutritional deficiency disease?

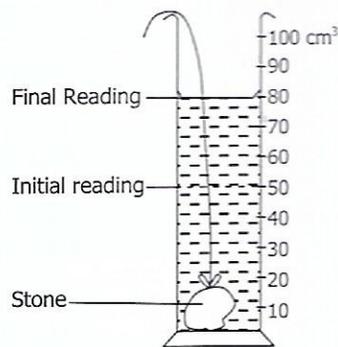
- A 1
- B 2
- C 3
- D 4

- 4 Which of the following is a natural cause of air pollution?
 A Chimney emissions from manufacturing industries. <
 B Dust from road construction sites. <
 C Exhaust gases from motor cars. ✓
 D Volcanic gases during an eruption.
- 5 The following diagram shows the structures in a plant cell.



Which structures are found in both animal and plant cells?

- A 1, 2 and 3
 B 1, 3 and 4
 C 2, 5 and 6
 D 4, 5 and 6
- 6 Which of the following shows the nutritional deficiency symptoms in a plant lacking potassium? The plant will have ...
 A leaves that will turn dark green and then purple.
 B leaves that will have yellow or brown edges and eventually die.
 C poorly developed root system.
 D slow, stunted growth and yellow leaves.
- 7 The diagram shows a stone of mass 90g in a measuring cylinder containing water.



What is the density of the stone?

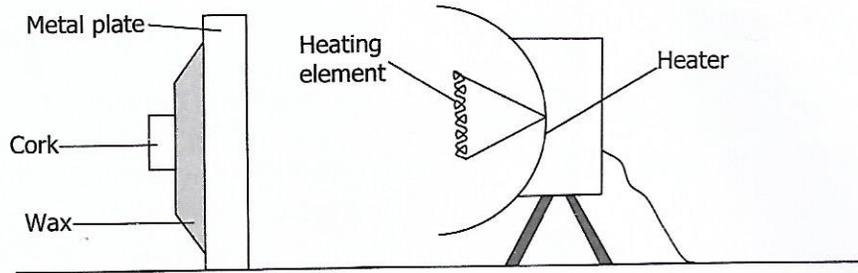
- A 0.8g/cm³
 B 3g/cm³
 C 30g/cm³
 D 50g/cm³

Handwritten calculations for question 7:

$$V_2 - V_1 = 80 - 50 = 30$$

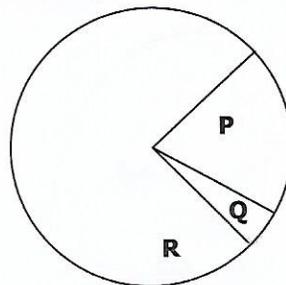
$$D = \frac{M}{V} = \frac{90}{30} = 3 \text{ g/cm}^3$$

- 8 A small cork is fixed with wax to a metal plate placed close to an electric heater which is switched on as shown in the diagram.



How does the heat reach the wax? By ...

- A conduction and radiation.
 - B conduction only.
 - C convection and radiation.
 - D radiation only.
- 9 Which of the following is correct about the characteristics of an image formed by a plane mirror? The image is ...
- A real and bigger than the object.
 - B real and upright.
 - C virtual and same size as object.
 - D virtual and upright.
- 10 The pie chart shows composition of air.

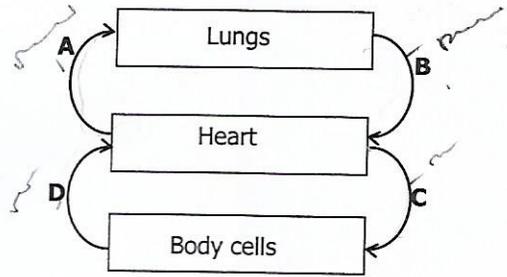


Composition of air

Which of the following is correct about the composition of air?

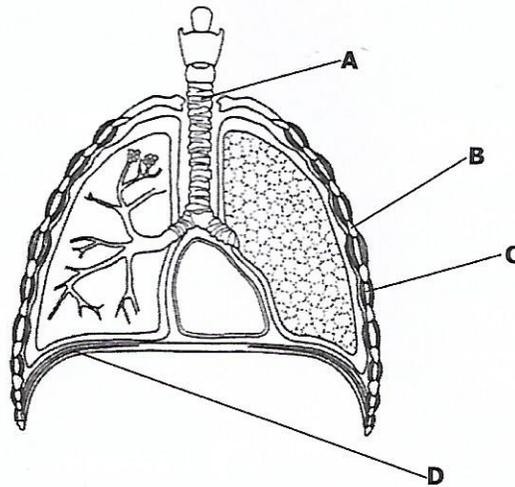
	Oxygen	Nitrogen	Carbon dioxide and other gases
A	P	R	Q
B	P	Q	R
C	Q	P	R
D	R	Q	P

11 The following diagram shows dual blood circulatory system in human beings.



Which of the labelled parts **A**, **B**, **C** or **D** shows an artery carrying oxygenated blood?

12 The diagram shows part of the human respiratory system.



Identify the organ called diaphragm.

13 Which of the following STIs can be transmitted through kissing?

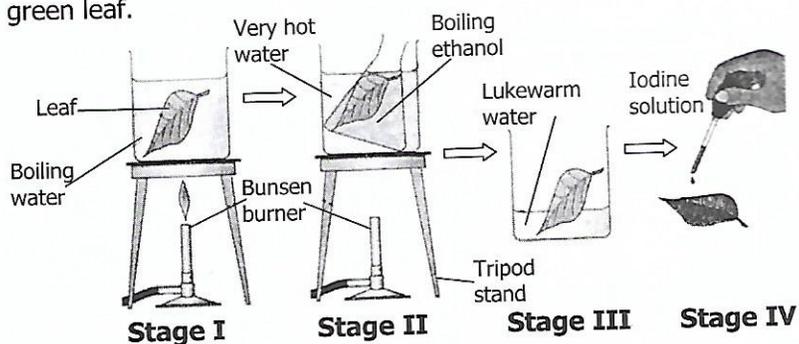
- A Genital warts
- B Gonorrhoea
- C HIV and AIDS
- D Syphilis

14 Which of the following processes does **not** take place at a water purification plant?
Removal of ...

- A biological contaminants. ✓
- B chlorine. ✓
- C suspended solids.
- D undesirable chemicals.

50
11/17
6/1
55
11/1
72

- 15 The following diagram shows the stages of an experiment on starch test in a green leaf.

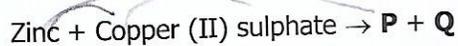


What will be the colour of the leaf after stage II of the experiment?

- A Blue
 - B Blue-black
 - C Green
 - D White
- 16 A learner treated four identical leaves as follows:
- Leaf 1: Petroleum jelly was applied to both lower and upper surfaces
 - Leaf 2: Petroleum jelly was applied only to the lower surface
 - Leaf 3: Petroleum jelly was applied only to the upper surface
 - Leaf 4: Was left untreated (without applying petroleum jelly).

Which leaf will stay fresh for a long time?

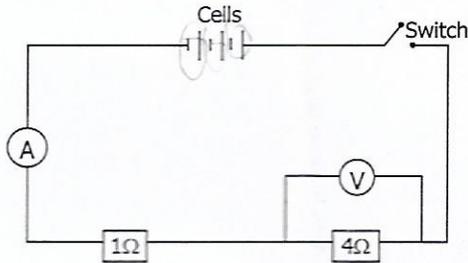
- A 1
 - B 2
 - C 3
 - D 4
- 17 In a chemical reaction, Zinc and Copper (II) sulphate solution react to form substance **P** and **Q** as shown in the following incomplete word equation:



What do the letters **P** and **Q** stand for in the word equation?

	P	Q
A	Copper	Zinc
B	Copper	Sulphate
C	Zinc	Sulphate
D	Zinc Sulphate	Copper

- 18 The following diagram shows an electric circuit with cells of 2 volts each connected to two resistors (1Ω and 4Ω).



What will be the reading of **V** in the circuit?

- A 1.2V
- B 1.5V
- C 4.8V
- D 5.0V

Handwritten notes for question 18:

- $V = R \times I$
- $V = \frac{R}{I}$
- $V = \frac{2}{\frac{1}{4}}$
- $V = 8$
- $V = I \times R$
- $V = \frac{V}{R}$
- $V = \frac{V}{I}$

- 19 Which equation correctly states the formula that can be used to calculate pressure?

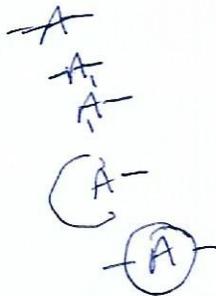
- A Pressure = Force \times Distance
- B Pressure = Force \times Area
- C Pressure = $\frac{\text{Force}}{\text{Area}}$
- D Pressure = $\frac{\text{Force}}{\text{Distance}}$

Handwritten notes for question 19:

- $P = \frac{F}{A}$
- $V = \frac{V}{A}$
- $\frac{3}{5}$

- 20 A geostationary satellite is one which ...

- A is stationed on earth as it transmits information.
- B moves beyond the earth exploring the space.
- C moves so as to remain in the same area above the earth.
- D orbits in the atmosphere as it receives information.



Handwritten notes for question 20:

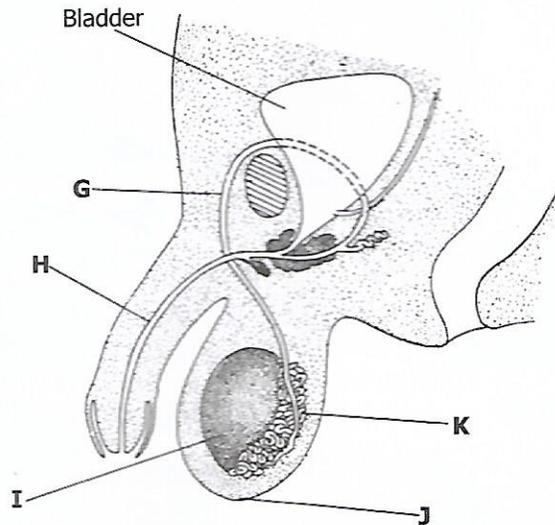
- A meter
- A meter
- Appa.
- A meter

SECTION B (60 Marks)

Write all the answers in the spaces provided in the Answer Booklet.

1 THE HUMAN BODY

The following diagram shows the male reproductive system.



- (a) Identify the parts labelled **H** and **J**. [2]
- (b) Apart from sperms, which other substance passes through organ **G**? [1]
- (c) State the functions of
- (i) organ **K**, [1]
 - (ii) the substance produced by organ **I**. [1]
- (d) Give **one** reason why it is important to observe personal hygiene of the reproductive organs. [1]

Total: 6 marks

testes

scrotum

urine

urethra

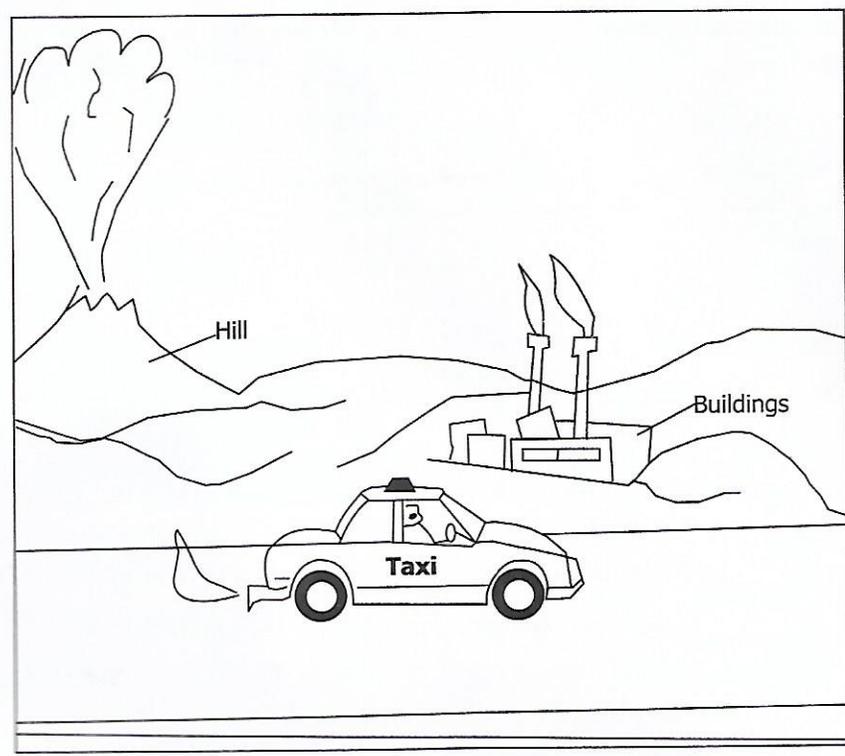
urethra

urethras

urethra
urii

2 THE ENVIRONMENT

The following picture shows natural and human activities in the environment.

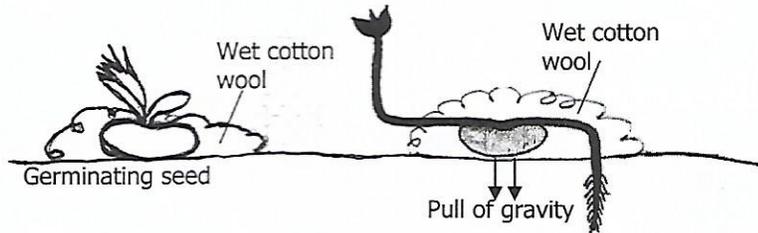


- (a) Name the type of pollution illustrated in the picture. [1]
- (b) From the picture, identify a source of pollution caused by a
 - (i) natural event, [1]
 - (ii) human activity. ✓ [1]
- (c) Mention **one** pollutant that would be produced from the human activities in the picture. [1]
- (d) Explain the effects of the type of pollution named in question (a) above on
 - (i) buildings,
 - (ii) living organisms. [2]

Total: 6 marks

3 PLANTS AND ANIMALS

The following diagrams show an experiment on an investigation of the effects of gravity on parts of a plant using a germinating seed. After a few days the germinating seed showed some changes as shown.



Beginning of Experiment

End of Experiment

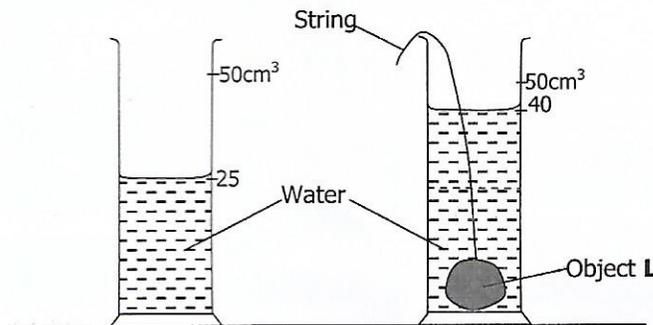
- (a) State the type of response shown by the
 - (i) shoot, [1]
 - (ii) root. [1]
- (b) Explain why the shoot grew vertically after a few days. [1]
- (c) Give **two** advantages of the response shown by the root. [2]
- (d) Mention **one** major element important for plant growth. [1]

Total: 6 marks

4 MATERIALS AND ENERGY

The following diagram shows an experiment used to determine the volume of object L.

Handwritten notes:
 $\frac{30}{25} = 1.2$
 $\frac{30}{1.2} = 25$
 $\frac{30}{1.2} = 25$



Handwritten notes:
 25 cm^3
 $V_2 - V_1$

- (a) What is the volume of the water used in the experiment? [1]
- (b) Calculate the
 - (i) volume of object L, [1]
 - (ii) density of object L, if its mass is 30g. (Show your working) [2]
- (c) Write **two** precautions to be considered when carrying out such an experiment. [2]

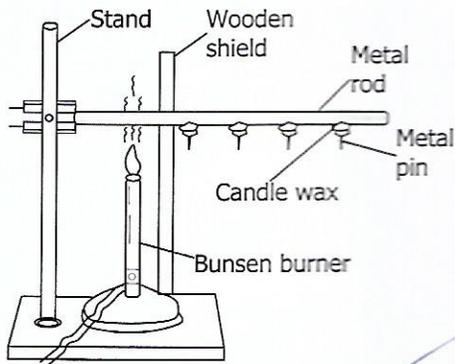
Handwritten note: accurate

Total: 6 marks

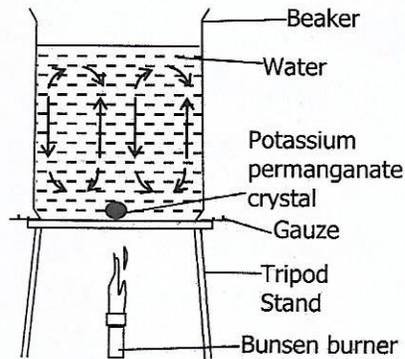
Handwritten calculations:
 $\frac{30}{1.2} = 25$
 $\frac{30}{1.2} = 25$
 $\frac{30}{1.2} = 25$

5 MATERIALS AND ENERGY

The following diagrams show two experiments used to demonstrate different types of heat transfer.



Experiment I



Experiment II

- (a) What type of heat transfer is being demonstrated in
- (i) experiment I, [1]
 - (ii) experiment II? [1]
- (b) What will happen to the candle wax and the metal pins in experiment I after some time? [1]
- (c) Explain the purpose of the potassium crystal in experiment II. [1]
- (d) What would happen to the candle wax if the metal rod is replaced by a glass rod and the experiment is repeated? [1]
- (e) Why was the wooden shield placed between the Bunsen flame and the candle wax and pin in experiment I? [1]

Total: 6 marks

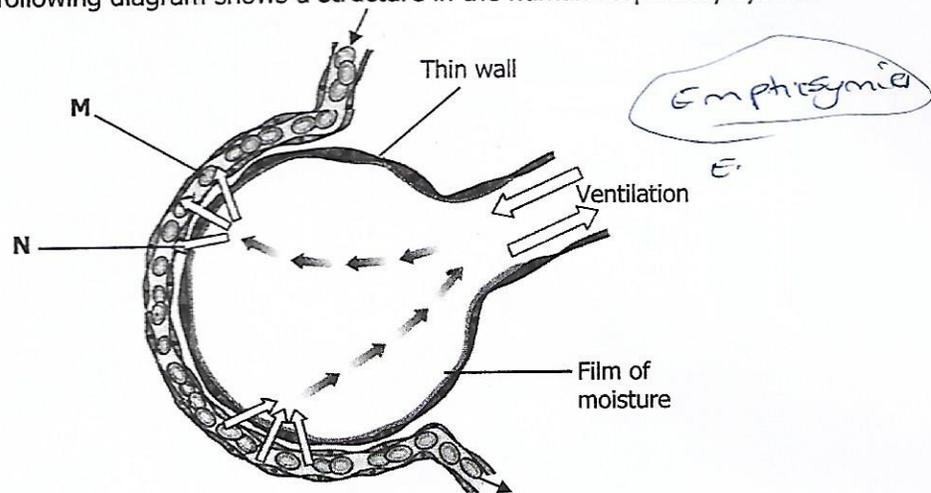
gases exchange

geotropism

catalyst

6 THE HUMAN BODY

The following diagram shows a structure in the human respiratory system.



- (a) What is the name of the structure shown in the diagram? [1]
- (b) Identify the parts labelled
- (i) M, [2]
- (ii) N. [2]
- (c) What is the function of the part labelled M? [1]
- (d) By what process are gases exchanged in the structure shown in the diagram? [1]
- (e) Explain **one** effect of tobacco and cigarette smoking on the structure shown in the diagram. [1]

Total: 6 marks

7 HEALTH

- (a) State **one** common Sexually Transmitted Infection (STI) that is caused by a bacteria in human beings. [1]
- (b) What is the name of the virus that causes the Acquired Immuno Deficiency Syndrome (AIDS)? [1]
- (c) Apart from AIDS, what other STI is caused by a virus? [1]
- (d) Mention the Sexually Transmitted Infection that causes blindness in unborn babies if not treated early. [1]
- (e) Describe **one** way of preventing the contraction of STIs and AIDS. [1]
- (f) Explain the negative effect of HIV and AIDS on the health services of a population. [1]

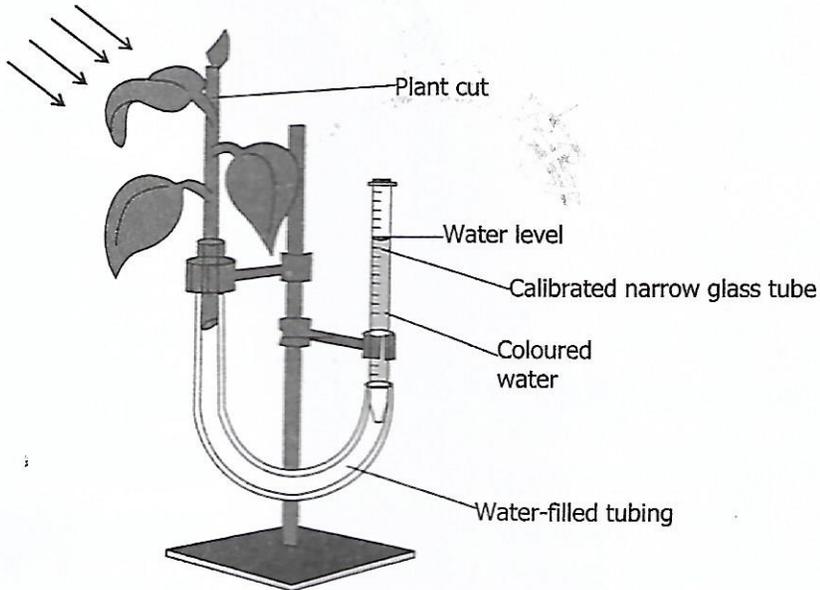
Total: 6 marks

~~abstinence~~
abstinence

our sack
our sack
our sack

8 PLANTS AND ANIMALS

The following diagram shows the apparatus set up to investigate factors that affect the rate of transpiration in plants.



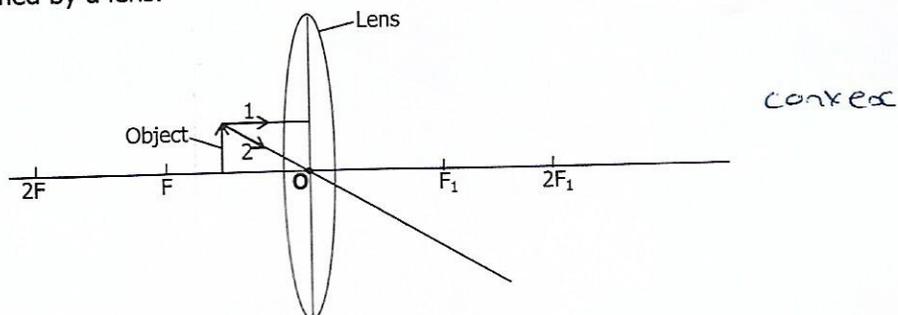
- (a) What name is given to an apparatus shown in the diagram? [1]
- (b) What would happen to the rate of movement of the coloured water level in the narrow glass tube if the apparatus is moved to a place with very bright light? [1]
- (c) Apart from light, state **one** other physical factor in the environment that affects the rate of transpiration. [1]
- (d) State **one** biological factor that affects the rate of transpiration. [1]
- (e) Why is coloured water used in the apparatus? [1]
- (f) Why is transpiration important in plants? [1]

Total: 6 marks

✓

9 MATERIALS AND ENERGY

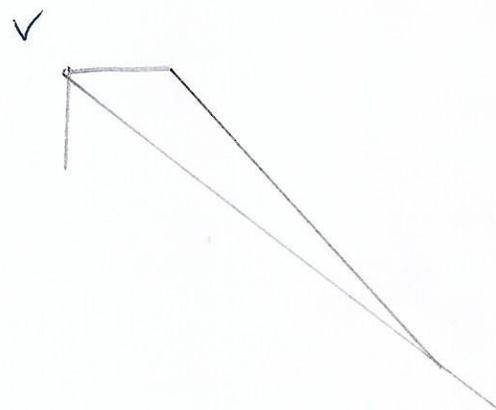
The following diagram shows the apparatus set up to determine the image formed by a lens.



- (a) What type of lens is used in the ray diagram? [1]
- (b) Identify the position labelled **O** in the diagram. [1]
- (c) Complete the construction of the ray diagram to locate the position of the image. [1]
- (d) Describe the nature of the image formed. [1]
- (e) Which optical instrument uses such a lens to obtain the type of image formed in (c)? [1]
- (f) What is the name of a glass or plastic shaped piece that can be used to disperse white light into different colours of light? [1]

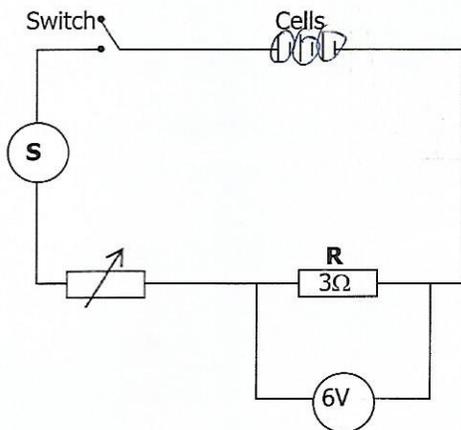
Total: 6 marks

spectrum



10 MATERIALS AND ENERGY

The electric circuit diagram shows cells connected to a resistor **R** in an experiment.



Handwritten calculations:
 $A = \frac{V}{R}$
 $A = \frac{6V}{3\Omega}$
 $A = 2A$

- (a) Define voltage in the electric circuit. [1]
- (b) Identify the instrument labelled **S** in the circuit. [1]
- (c) How many cells are shown in the circuit diagram? [1]
- (d) Calculate and state the meter reading at instrument **S** in the circuit diagram when the switch is closed. [1]
- (e) What would happen to the meter reading at **S** if the voltage in the circuit is doubled and the resistance **R** remains the same at 3Ω ? [1]
- (f) What does the result in the meter reading at **S** in (e) show about the relationship between voltage and current? [1]

Total: 6 marks

Handwritten calculation: $\frac{12}{3}$

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