Surname	Forename(s)	Centre Number	Candidate Number

For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMBINED SCIENCE 4003/2

PAPER 2 Theory

SPECIMEN PAPER 2 hours

Candidates answer on the question paper
Additional materials: Calculator (Optional)

Allow candidates 5 minutes to count pages before the examination.
This booklet should not be punched or stapled and pages should not be removed.

The Periodic Table which is provided as an insert should be retained by the centre.

TIME 2 hours

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top.
Write your centre and candidate number in the boxes on the top right corner of every page of this paper.
Check if the booklet has all the pages and ask the invigilator for a replacement if there are duplicate or missing pages.
Write your answers in the spaces provided on the question paper.
Section A
Answer **all** questions.
Section B
Answer any **two questions.**
Section C
Answer any **two** questions.
Section D
Answer any **two** questions.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question.
A copy of the Periodic Table is provided as an insert.

This specimen paper consists of 22 printed pages and 2 blank pages.

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Section A

Answer **all** questions in this section in the spaces provided.

1 **(a)** **(i)** State the enzyme that catalyses the digestion of

1. starch,

_____

2. fat.

_____ [2]

(ii) State the end product of the digestion of protein.

_____ [1]

(b) State any **one** adaptation of the alveolus for efficient gaseous exchange.

_____ [1]

1 **(c)** **Fig. 1.1** is a graph showing one factor affecting the rate of transpiration on a sunny day.

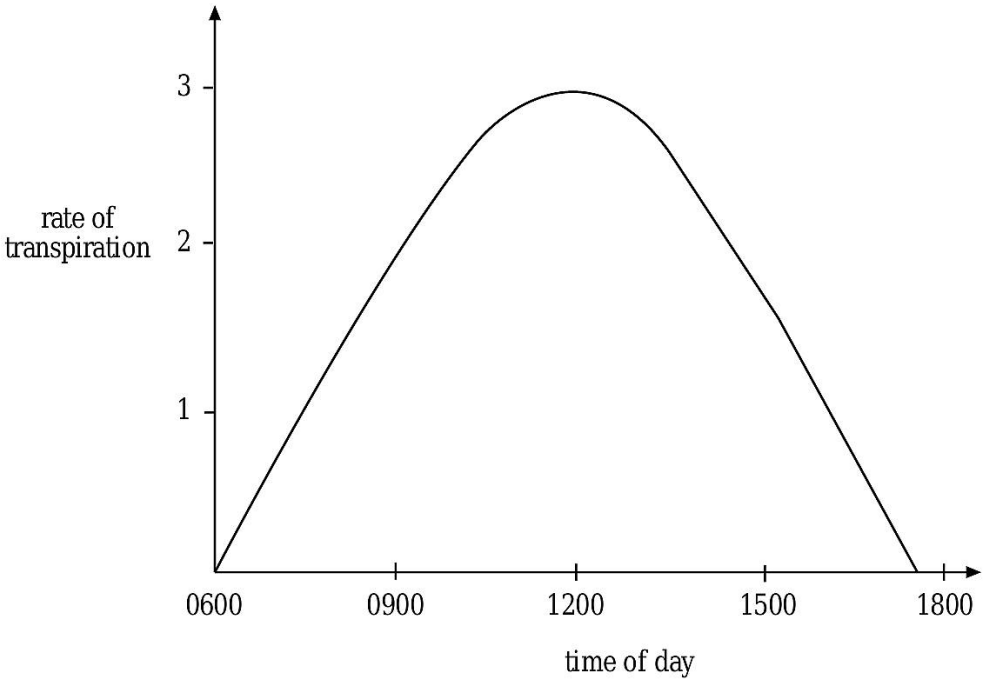


Fig. 1.1

(c) **(i)** Name the factor being investigated.

_____ [1]

(ii) Explain the shape of the graph.

_____

_____ [2]

[Total: 7]

2 **(a)** **(i)** State any **two** methods of vegetative reproduction in plants.

_____

_____

_____ [2]

(ii) Give **two** examples of plants that reproduce by vegetative means.

_____ [2]

(b) Describe any **three** advantages of vegetative reproduction.

_____

_____

_____

_____ [3]

[Total: 7]

3 **(a)** The nuclide notations of elements **X** and **Y** are given below.

$^{23}_{11}\mathbf{X}$ $^{35}_{17}\mathbf{Y}$

(i) State the number of protons and neutrons in element **X**.

protons _____

neutrons _____ [2]

(ii) Give the nuclide notation for a possible isotope of **Y**.

[2]

(iii) Write the electronic configuration of element **X**.

_____ [1]

(b) Calculate the relative molecular mass of sulphuric acid, H_2SO_4.

[2]
[Total: 7]

4 **Fig.4. 1** shows the structure of a hydrocarbon.

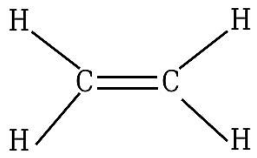


Fig. 4.1

(a) **(i)** Define the term hydrocarbon.

_____

_____ [1]

(ii) Name the hydrocarbon in **Fig. 4.1**.

_____ [1]

(iii) Explain why the hydrocarbon is said to be unsaturated.

_____ [1]

(iv) Name the homologous series to which the hydrocarbon belongs.

_____ [1]

4 **(b)** State any **two** uses of the hydrocarbon.

_____

_____

_____ [2]

[Total: 6]

5 **(a)** **(i)** Define the term current.

_____

_____ [1]

(ii) State the Standard International (S.I.) unit of current.

_____ [1]

(b) Select **two** electric conductors from the list given below:

perspex; pure water; salt solution; carbon rod; sugar solution, magnesium ribbon.

_____

_____ [2]

(c) A bulb is rated 60 W, 240 V.

Calculate the current it draws.

[3]

[Total: 7]

6 **Fig. 6.1** shows a solar cooker.

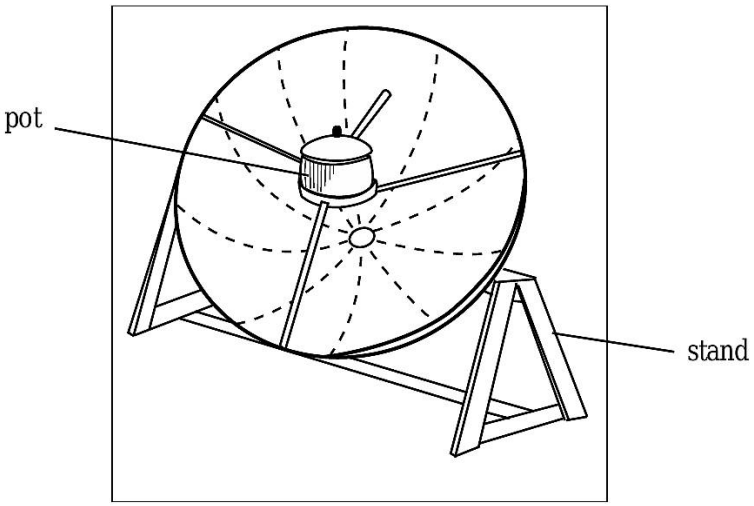


Fig. 6.1

(a) **(i)** Suggest, with a reason, the most suitable colour of the pot.

colour _____

reason _____

_____ [2]

(ii) Explain why the solar cooker

1. is curved,

_____

_____

2. has a shinny surface.

_____

_____ [2]

6 **(b)** State **two** other ways by which heat is transmitted, apart from radiation.

1. _____

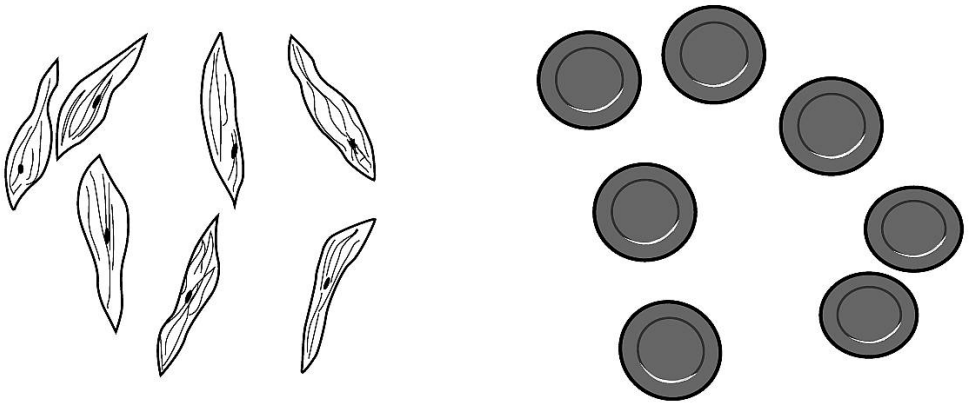
2. _____ [2]

[Total: 6]

Section B

Answer any **two** questions. Write your answers in the spaces provided on the question paper.

7 **(a)** **Fig. 7.1** shows two types of specialised cells, A and B.



A B

Fig. 7.1

(i) Identify cells A and B.

A _____

B _____ [2]

(ii) Explain how cell B is adapted for its function.

_____

_____

_____ [2]

7 **(a)** **(iii)** Outline how blood provides immunity to the body.

_____

_____ [2]

(b) **(i)** State any **two** conditions that are necessary for seeds to germinate.

1. _____

2. _____ [2]

(ii) A farmer planted 640 maize seeds on a prepared piece of land and after 7 days, 480 seeds had germinated.

Calculate the percentage germination.

[2]
[Total: 10]

8 **(a)** **Fig. 8.1** shows the structure of a flower.

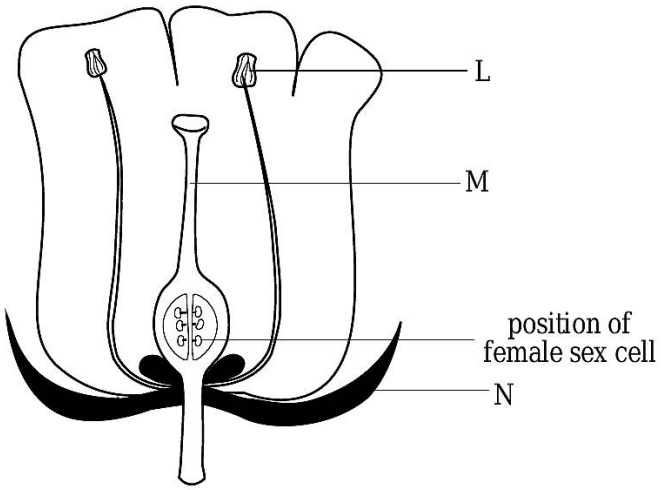


Fig. 8.1

(i) State the functions of parts L, M and N.

L _____

M _____

N _____ [3]

(ii) Suggest the type of pollination for the flower.

_____ [1]

(iii) Give **two** reasons for your answer in **(a)(ii)**.

1. _____

_____

2. _____

_____ [2]

8 **(a)** **(iv)** Explain how the male sex cell gets to the female sex cell.

_____

_____ [2]

(b) State any **two** signs of puberty in males.

1. _____

_____

2. _____

_____ [2]

[Total: 10]

9 **(a)** **(i)** Define aerobic respiration.

_____

_____ [1]

(ii) State **three** differences between inhaled and exhaled air.

_____

_____

_____ [3]

(iii) State **two** products of aerobic respiration in plants.

_____

_____ [2]

(b) State and explain any **two** adaptations by desert plants to reduce transpiration.

_____

_____

_____

_____ [4]

[Total 10]

SECTION C

Answer any **two** questions. Write your answers in the spaces provided on the question paper.

10 **Table 10.1** shows the effect of three substances A, B and C on universal indicator solution.

Table 10.1

substance	**effect on universal indicator solution**
A	red
B	green
C	purple

(a) **(i)** State the function of the universal indicator solution.

_____ [1]

(ii) Deduce the nature of substances B and C.

B _____

C _____ [2]

(b) Dilute hydrochloric acid is reacted with magnesium carbonate.

(i) State the type of reaction.

_____ [1]

(ii) Write a word equation for the reaction.

[2]

10 **(c)** Chemical equations for two redox reactions are given below:

$2FeCl_2 + Cl_2 \rightarrow 2FeCl_3$
$CuO + H_2 \rightarrow Cu + H_2O$

(i) Define oxidation in terms of

1. oxygen,

_____

_____

2. electron transfer.

_____

_____ [2]

(ii) State what happens, in terms of oxidation and reduction, to $FeCl_2$ and CuO in the two redox reactions.

$FeCl_2$

_____

_____

CuO

_____

_____
[2]
[Total: 10]

11 **Fig. 11.1** shows the blast furnace used for the extraction of iron.

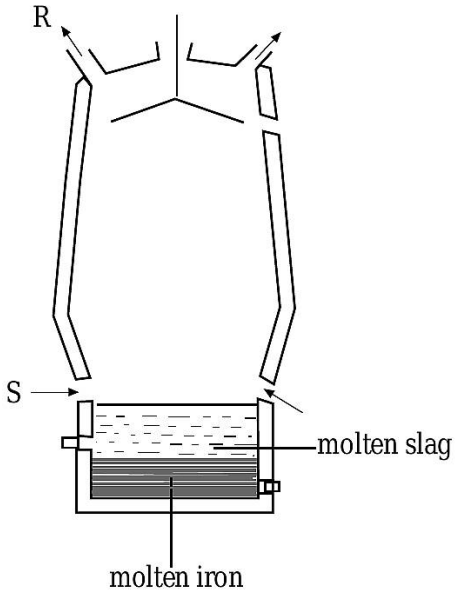


Fig. 11.1

(a) **(i)** Name the substance that enters the furnace through S.

_____ [1]

(ii) State what is released through R.

_____ [1]

11 **(b)** **(i)** Describe the main reactions which occur in the blast furnace.

_____

_____

_____

_____

_____

_____

_____ [4]

(b) **(ii)** Explain the advantages of having slag covering the molten iron.

_____

_____ [1]

(c) A sample of iron oxide was found to contain 70% iron.

Find the empirical formula of the iron oxide.

[3]
[Total: 10]

12 The flow chart in **Fig. 12.1** shows stages in the manufacture of sulphuric acid.

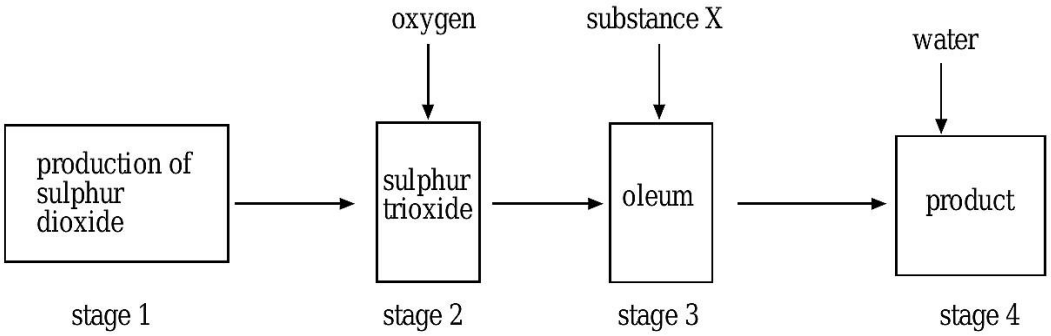


Fig. 12.1

(a) **(i)** Name the industrial process that produces sulphuric acid.

_____ [1]

(ii) Describe the production of sulphur dioxide in stage 1.

_____

_____ [1]

(iii) State the **three** conditions required in stage 2.

1. _____

2. _____

3. _____ [3]

(iv) Explain why stage 3 is necessary.

_____

_____ [1]

(v) Name substance X.

_____ [1]

12 **(a)** **(vi)** Write an equation for the process occurring in stage 4.

[1]

(b) State any **two** uses of sulphuric acid.

1. _____

_____

2. _____

_____ [2]

[Total: 10]

SECTION D

Answer any **two** questions. Write your answers in the spaces provided on the question paper.

13 **(a)** **(i)** State Newton's first law of motion.

_____

_____ [2]

(ii) Explain why a book sliding and experiencing a frictional force of 9 N keeps on sliding across a desk.

_____

_____ [1]

(b) A block of mass 2 kg is accelerated by a force of 4 N.

Calculate the acceleration.

[3]

(c) **(i)** State **three** events which occur in the power stroke of the petrol engine.

_____

_____

_____

_____ [3]

(ii) State **one** advantage of modern petrol engines over the old petrol engines.

_____

_____ [1]

[Total: 10]

14 **(a)** Define the term telecommunications.

_____

_____ [2]

(b) Give **two** examples of telecommunication systems.

_____

_____ [2]

(c) **Fig. 14.1** shows the components of a communication system.

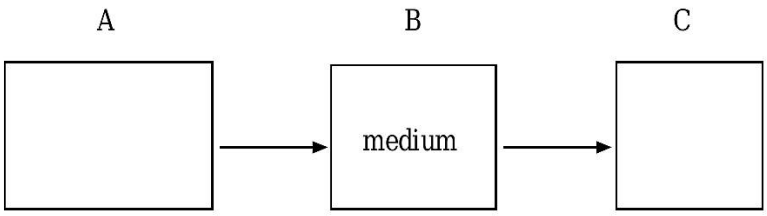


Fig. 14.1

(i) Name components A and C.

A _____

C _____ [2]

(ii) Describe the functions of component A.

_____

_____ [2]

(d) Describe **two** advantages of a cellphone over a landline.

_____

_____

_____ [2]

[Total 10]

15 **(a)** **Fig. 15.1** shows the energy conversion in a thermal power station.

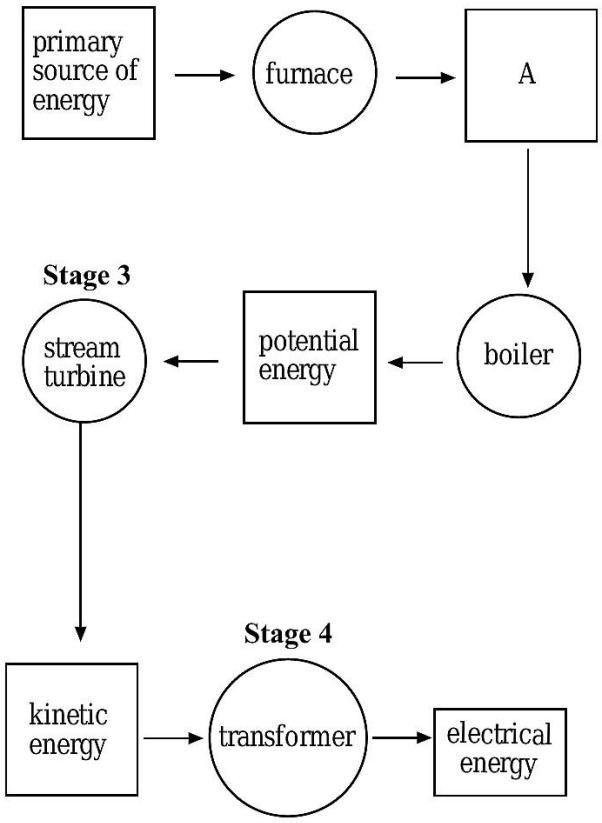


Fig. 15.1

(i) Name a possible primary source of energy in Zimbabwe.

_____ [1]

(ii) State **two** disadvantages of the energy source named in **(i)**.

_____

_____ [2]

(iii) Give the form of energy represented by A.

_____ [1]

15 **(a)** **(iv)** Describe what happens at stages 3 and 4.

_____

_____

_____

_____ [4]

(b) State the energy conversion in a hydroelectric power station.

_____

_____ [2]

[Total: 10]

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