

Candidate Name

Centre Number

Candidate Number

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ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

COMBINED SCIENCE**4003/2**

PAPER 2 Theory

NOVEMBER 2022 SESSION**2 Hours**

Additional materials:
Answer sheets
Calculator (Optional)
String

The Periodic Table is provided on page 15.

Time 2 Hours

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top.

Section A

Answer all questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any two questions.

Write your answers on the separate answer paper provided.

Section C

Answer any two questions.

Write your answers on the separate answer sheets provided.

Section D

Answer any two questions.

Write your answers on the separate answer sheets provided.

For examiner's use	
Section A	
Section B	/
Section C	/
Section D	/
TOTAL	

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question.

This question paper consists of 15 printed pages and 1 blank page.

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Section A

Answer all questions in this section in the spaces provided on the question paper.

1. Fig.1.1 shows a diagram of a specialised cell.

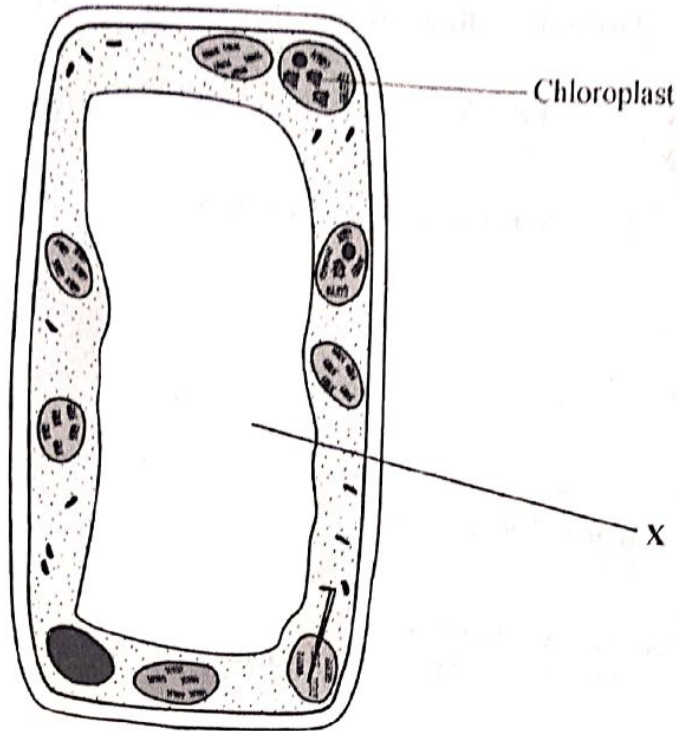


Fig.1.1

- (i) Identify the cell in Fig.1.1. [1]
- (ii) State the function performed by the cell shown in Fig.1.1. [1]
- (iii) Name part X. [1]

(b) Describe what happens to the glucose and oxygen made in a leaf.

glucose

oxygen

[2]

(c) (i) Give **one** function of guard cells.

[1]

(ii) Explain how guard cells are adapted for the function stated in (i).

[1]

2. (a) Name **two** female sex hormones.

[2]

(b) Describe the roles of the hormones named in (a) in the menstrual cycle.

[3]

(c) (i) Define the term *ovulation*.

[1]

(ii) State the range of days of the menstrual cycle when sexual intercourse is most likely to result in pregnancy.

[1]

3. (a) State any **two** processes which can be used to support the kinetic theory.

[2]

(b) When a gas is compressed, state the property which

(i) increases,

[1]

(ii) decreases.

[1]

(iii) Explain why it is easier to compress a gas than a solid.

[2]

4. A science teacher orders iron, zinc, copper and magnesium for use during laboratory practical lessons.

From the ordered metals, state the one

(a) (i) which reacts very slowly with air to form a greenish compound,

[1]

(ii) whose powder burns to form a yellow oxide when hot,

[1]

(iii) which burns easily to form a white solid.

[1]

(b) Arrange the four metals in their order of decreasing reactivity.

[2]

- (c) Explain why an iron nail placed in copper sulphate solution becomes coated with copper.

[2]

5. (a) State **one** difference between a petrol engine and a diesel engine.

[1]

- (b) Describe what happens during the power stroke of a petrol engine.

[3]

- (c) Name any **two** gases which are released in car exhaust fumes.

[2]

6. (a) (i) State **one** effect of force.

[1]

- (ii) Name the instrument used for measuring force.

[1]

(iii) State the Standard International (S. I) unit of force.

[1]

(b) Fig.6.1 shows an electric circuit in which a cell is used to light a bulb.

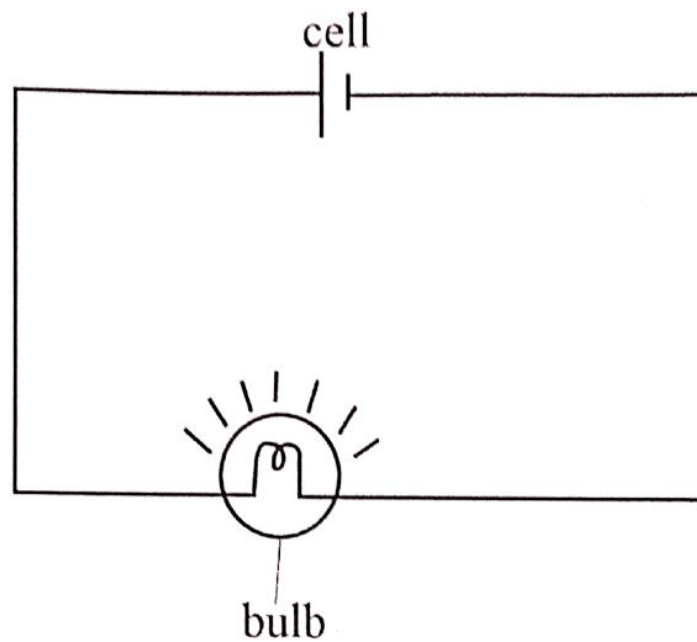


Fig.6.1

Construct an energy chain for Fig.6.1.

[2]

(c) (i) State any **one** effect of energy.

[1]

(ii) Suggest **one** advantage of solar energy.

[1]



For
Examiner
Use

Section B

For
Examiner's
Use*Answer any two questions.**Write your answers on the separate answer sheets provided.*

7. (a) (i) Name the causative pathogen of malaria. [1]
 (ii) State any **three** symptoms of malaria. [3]
 (b) State any **two** diseases that may be caused by tobacco smoking. [2]
 (c) (i) State any **two** effects of excessive alcohol consumption. [2]
 (ii) Explain why drinking alcohol while driving is **not** allowed in Zimbabwe. [2]
8. (a) (i) Explain the difference between mechanical digestion and chemical digestion. [2]
 (ii) Mention any **two** uses of amino acids in the body. [2]
 (b) (i) Name any **two** types of teeth. [2]
 (ii) State the function of each type of tooth named in (b)(i). [2]
 (c) Describe any **two** ways of keeping teeth health. [2]
9. (a) (i) Define the term *asexual reproduction*. [1]
 (ii) Describe **four** advantages of asexual reproduction. [4]
 (b) (i) State any **two** methods of contraception. [2]
 (ii) Describe any **three** effects of an increase in human population on the environment. [3]

Section C

Answer any *two* questions.

Write your answers on the separate answer sheets provided.

10. (a) (i) Describe the manufacture of ethanol by fermentation. [3]
- (ii) State any **two** uses of ethanol. [2]
- (b) (i) Name the homologous series to which ethanol belongs. [1]
- (ii) Draw the structural formula of ethanol. [1]
- (c) An organic compound X was analysed and found to contain the following percentages:
52.2% carbon 13.0% hydrogen 34.8% oxygen
Calculate the empirical formula of X. [3]
11. (a) Fuels release energy when they burn.
- (i) State **one** example of a
1. gaseous fuel, [2]
 2. solid fuel. [2]
- (ii) Give **two** advantages of gaseous fuels over solid fuels. [2]
- (b) Explain a danger of incomplete combustion of fuel in a bedroom which has poor ventilation. [2]
- (c) (i) State any **two** properties of an acid. [2]
- (ii) State any **two** properties of a base. [2]

12. (a) Fig.12.1 gives a flow chart showing the domestic process of producing peanut butter.

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Use

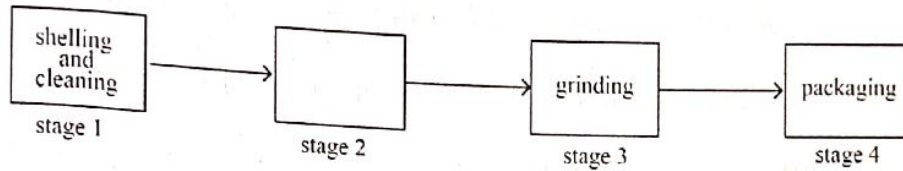


Fig.12.1

Name the equipment needed for

- (i) stage 1, [2]
- (ii) stage 3. [2]
- (b) (i) Describe what happens during stage 2. [2]
- (ii) Explain the importance of stage 2. [3]
- (iii) Describe how peanut oil is produced from peanut butter. [1]
- (iv) State any **two** uses of peanut oil. [2]

Section D

Answer any two questions.

Write your answers on the separate answer sheets provided.

13. (a) A 400 kg car is moving with a constant velocity of 100 m/s.

(i) Define the term *velocity*.

[2]

(ii) Calculate the momentum of the car.

[3]

- (b) Fig.13.1 shows an inclined plane.

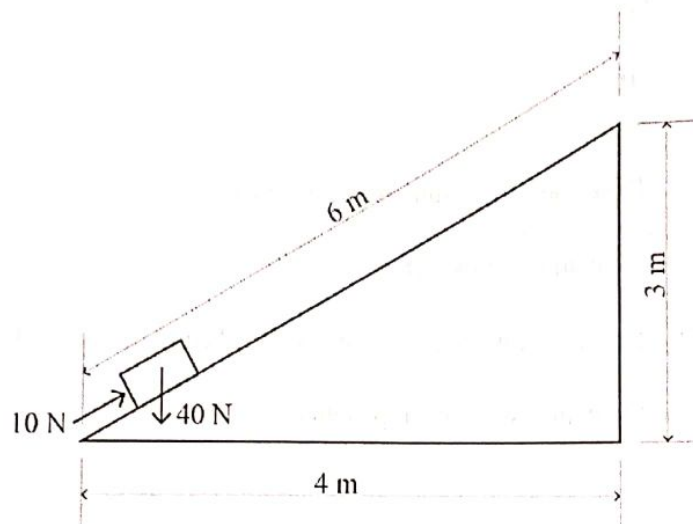


Fig.13.1

(i) Calculate the mechanical advantage, MA, of the inclined plane.

[2]

(ii) Calculate the velocity ratio, VR, of the inclined plane.

[2]

(iii) State any **one** factor that results in more energy losses in machines.

[1]

14. (a) Fig.14.1 shows water in a pot being heated on a hot plate.

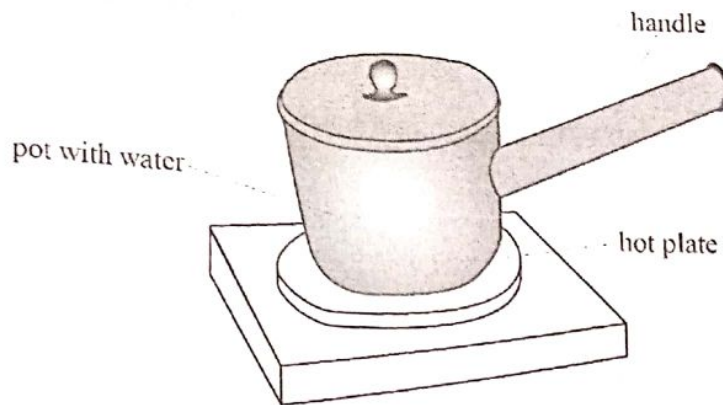


Fig.14.1

- (i) State the method of heat transfer from the hot plate to the pot. [1]
- (ii) State, giving a reason, a suitable material for making the handle of the pot. [2]
- (iii) Explain the process of convection in terms of the kinetic theory of matter. [3]
- (b) (i) Define the term *lightning*. [1]
- (ii) State any three precautions to be taken against lightning. [3]

For
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15. (a) (i) List any **one** source of light energy. [1]
- (ii) Describe the evidence that shows that light travels in a straight line. [1]
- (b) Fig. 15.1 shows **two** musical instruments, A and B.

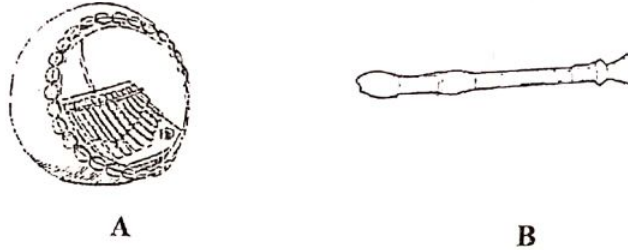


Fig.15.1

Explain how sound is produced in

- (i) instrument A, [2]
- (ii) instrument B. [2]
- (c) (i) Define the term *work*. [1]
- (ii) Calculate work done when a weight of 600 N is lifted vertically through 6.5 m. [3]

DATA SHEET
The Periodic Table of the Elements

		Group																																					
		I		II		III										IV		V		VI		VII		O															
		1 H Hydrogen																																					
		2 He Helium																																					
3	Li Lithium	4	Be Beryllium																	5	B Boron	6	C Carbon	7	N Nitrogen	8	O Oxygen	9	F Fluorine	10	Ne Neon								
11	Na Sodium	12	Mg Magnesium																	13	Al Aluminium	14	Si Silicon	15	P Phosphorus	16	S Sulphur	17	Cl Chlorine	18	Ar Argon								
19	K Potassium	20	Ca Calcium																	21	Ga Gallium	22	Ge Germanium	23	As Arsenic	24	Se Selenium	25	Br Bromine	26	Kr Krypton								
27	Rb Rubidium	28	Sr Strontium																	29	In Indium	30	Sn Tin	31	Sb Antimony	32	Te Tellurium	33	I Iodine	34	Xe Xenon								
37	Cs Caesium	38	Ba Barium																	39	Tl Thallium	40	Pb Lead	41	Bi Bismuth	42	Po Polonium	43	At Astatine	44	Rn Radon								
55	Fr Francium	56	Ra Radium																	57	Lr Lawrencium	58	Ac Actinium																

*58-71 Lanthanoid series
†90-103 Actinoid series

Key
a = relative atomic mass
X = atomic symbol
b = proton (atomic) Number

140	Ce Cerium	141	Pr Praseodymium	144	Nd Neodymium	150	Pm Promethium	152	Eu Europium	157	Gd Gadolinium	159	Tb Terbium	162	Dy Dysprosium	165	Ho Holmium	167	Er Erbium	169	Tm Thulium	173	Yb Ytterbium	175	Lu Lutetium		
232	Th Thorium	231	Pa Protactinium	238	U Uranium	238	Np Neptunium	238	Pu Plutonium	238	Am Americium	238	Cm Curium	238	Bk Berkelium	238	Cf Californium	238	Es Einsteinium	238	Fm Fermium	238	Md Mendelevium	238	No Nobelium	238	Lr Lawrencium

The volume of one mole of any gas is 28 dm³ at room temperature and pressure (r.t.p.)