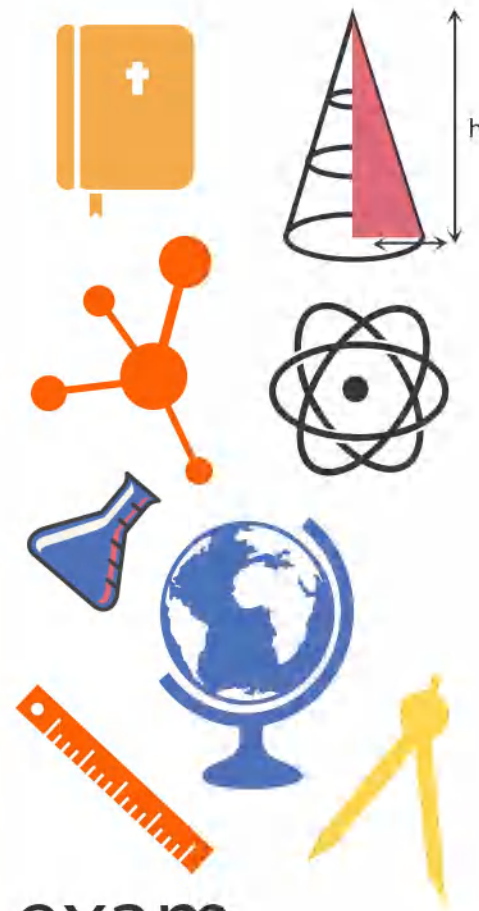


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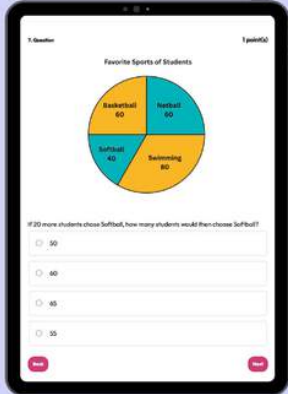


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COMBINED SCIENCE

PAPER 1 3102/1

Wednesday **29 MAY 2024** 12:00 NOON–1:15 P.M.

No additional materials required.

**MINISTRY OF EDUCATION
NATIONAL EXAMINATIONS**

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS FOR CANDIDATES**Do not open this booklet until you are told to do so.**

Write your school number, candidate number, surname and initials in the spaces provided on this question booklet.

There are **FIFTY** questions on this paper.

Attempt **ALL** questions.

For each question, there are **FOUR** possible answers labelled **A, B, C** and **D**. Choose the **ONE** you consider correct and record your choice by circling the **LETTER** next to the answer of your choice in the booklet.

A copy of the Periodic Table is printed on page 2.

Calculators are permitted, however **NO** graphing calculators are allowed.

FOR EXAMINER'S USE ONLY

Total Marks

This question paper consists of 16 printed pages.

Group

Group

I	II							III	IV	V	VI	VII	0					
1 H Hydrogen																		
3 7 Li Lithium	4 9 Be Beryllium							5 11 B Boron	6 12 C Carbon	7 14 N Nitrogen	8 16 O Oxygen	9 19 F Fluorine	2 4 He Helium					
11 23 Na Sodium	12 24 Mg Magnesium							13 27 Al Aluminium	14 28 Si Silicon	15 31 P Phosphorus	16 32 S Sulphur	17 35.5 Cl Chlorine	10 20 Ne Neon					
19 39 K Potassium	20 40 Ca Calcium	21 45 Sc Scandium	22 48 Ti Titanium	23 51 V Vanadium	24 52 Cr Chromium	25 55 Mn Manganese	26 56 Fe Iron	27 59 Co Cobalt	28 59 Ni Nickel	29 64 Cu Copper	30 65 Zn Zinc	31 70 Ga Gallium	32 73 Ge Germanium	33 75 As Arsenic	34 79 Se Selenium	35 80 Br Bromine	36 84 Kr Krypton	
37 85 Rb Rubidium	38 88 Sr Strontium	39 89 Y Yttrium	40 91 Zr Zirconium	41 93 Nb Niobium	42 96 Mo Molybdenum	43 98 Tc Technetium	44 101 Ru Ruthenium	45 103 Rh Rhodium	46 106 Pd Palladium	47 108 Ag Silver	48 112 Cd Cadmium	49 115 In Indium	50 119 Sn Tin	51 122 Sb Antimony	52 128 Te Tellurium	53 127 I Iodine	54 131 Xe Xenon	
55 133 Cs Caesium	56 137 Ba Barium	57 139 La Lanthanum	72 178 Hf Hafnium	73 181 Ta Tantalum	74 184 W Tungsten	75 186 Re Rhenium	76 190 Os Osmium	77 192 Ir Iridium	78 195 Pt Platinum	79 197 Au Gold	80 201 Hg Mercury	81 204 Tl Thallium	82 207 Pb Lead	83 209 Bi Bismuth	84 210 Po Polonium	85 210 At Astatine	86 210 Rn Radon	
87 Fr Francium	88 226 Ra Radium	89 227 Ac Actinium																
*58-71 Lanthanoid series †90-103 Actinoid series																		
a = relative atomic mass X = atomic symbol b = proton (atomic) number																		
Key a X b																		
													67 165 Ho Holmium	68 167 Er Erbium	69 169 Tm Thulium	70 173 Yb Ytterbium	71 175 Lu Lutetium	
													98 162 Dy Dysprosium	99 165 Es Einsteinium	100 167 Fm Fermium	101 169 Md Mendelevium	102 173 No Nobelium	103 175 Lr Lawrencium

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

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

1. When John shined a flash light in Sarah's eyes, her pupils constricted.

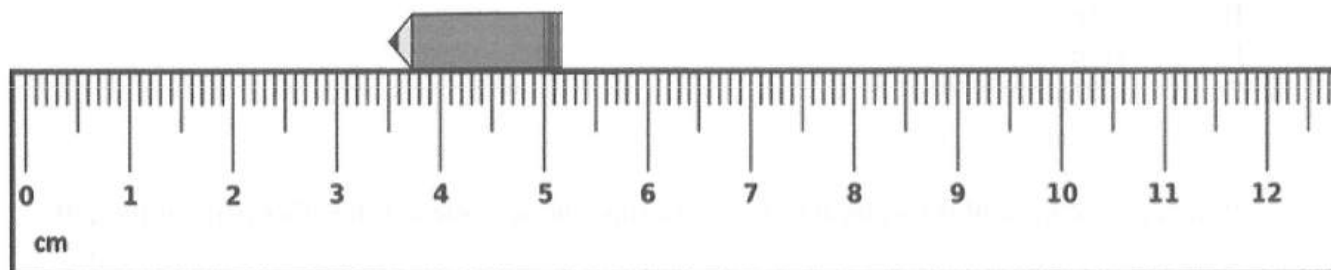
Which characteristic of living things does this show?

- A. excretion
- B. growth
- C. irritability
- D. respiration

2. Which row in the table correctly describes what happens when a solid becomes a liquid and a gas becomes a liquid?

	Solid becomes a liquid	Gas becomes a liquid
A.	heat energy decreases	heat energy increases
B.	heat energy decreases	heat energy decreases
C.	heat energy increases	heat energy decreases
D.	heat energy increases	heat energy increases

3. What is the length of the pencil shown?



- A. 1.7 cm
- B. 3.5 cm
- C. 5.0 cm
- D. 5.2 cm

4. Mushroom, mould and mildew are examples of fungi.

Which is another example of a fungus?

- A. alga
- B. amoeba
- C. fern
- D. yeast

5. Which statement about a neutron is **not** correct?

- A. It can be present in different numbers in atoms of the same element.
- B. It has no electrical charge.
- C. It is always found in the nucleus of an atom.
- D. It has much less mass than the proton.

6. A rock has a volume of 4.0 cm^3 and a density of 3.0 g/cm^3 .

What is its mass?

- A. 0.75 g
- B. 3.0 g
- C. 4.0 g
- D. 12.0 g

7. Which part of the cell is responsible for controlling the activities of the other parts of the cell?

- A. cell wall
- B. cytoplasm
- C. nucleus
- D. vacuole

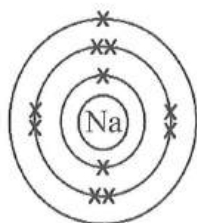
8. Which process is used to obtain a liquid solvent from a solution?

- A. chromatography
- B. combustion
- C. distillation
- D. filtration



9. Weight is an example of which quantity?
- A. acceleration
 - B. force
 - C. mass
 - D. power
10. Which is the loss of water from the leaf of the plant?
- A. evaporation
 - B. translocation
 - C. transpiration
 - D. wilting

11. The diagram shows the electron structure of a sodium atom.



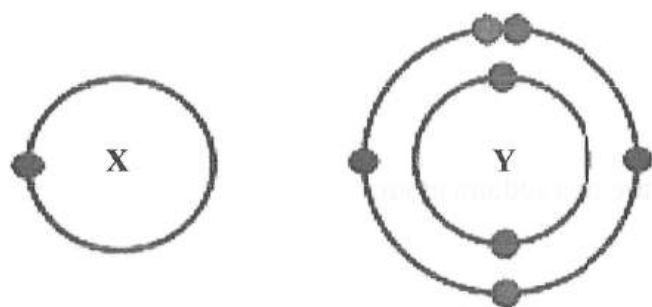
When an atom of sodium becomes an ion it will have the same electron structure as which element?

- A. argon
 - B. chlorine
 - C. magnesium
 - D. neon
12. The cooling fins of a refrigerator are painted black.
- Which method(s) of heat transfer does this improve?
- A. conduction and convection
 - B. conduction only
 - C. convection only
 - D. radiation only

13. Which process occurs when undigested components of food are removed from the anus?

- A. absorption
- B. assimilation
- C. egestion
- D. excretion

14. The diagram shows the electron structure of atoms **X** and **Y**.



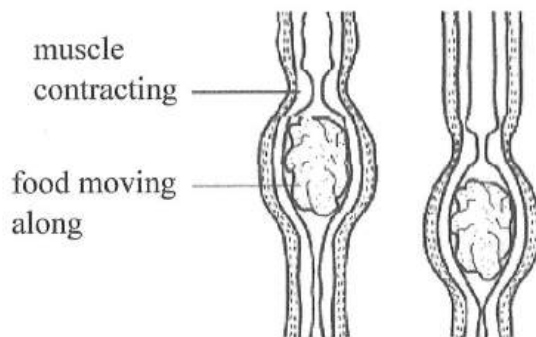
- A. **YX**
- B. **YX₃**
- C. **YX₅**
- D. **Y₃X**

15. Which of the following units is equivalent to 1 J/s?

- A. meter
- B. newton
- C. volt
- D. watt



16. The diagram shows a ball of food (bolus) in the oesophagus.



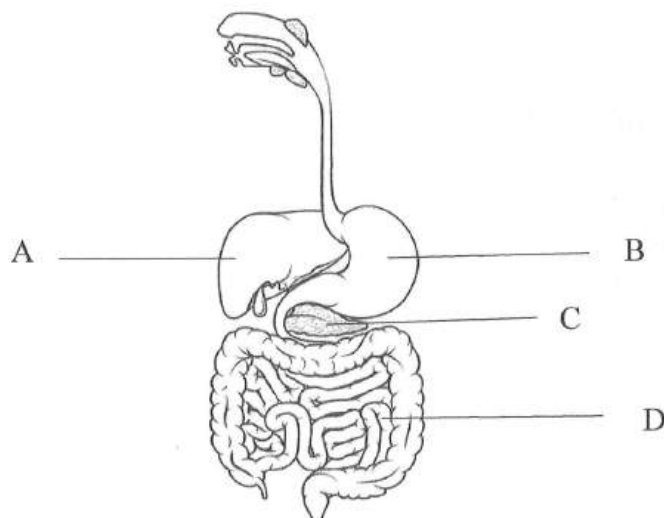
What process is occurring in the diagram?

- A. absorption
 - B. assimilation
 - C. excretion
 - D. peristalsis
17. A word equation is shown:



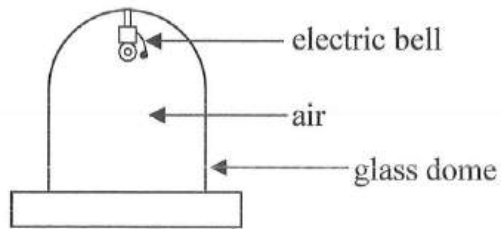
What is represented in this word equation?

- A. a chemical reaction between iron and iron oxide in which oxygen is produced
 - B. a chemical reaction between iron and oxygen in which iron oxide is produced
 - C. a physical change between iron and oxygen that forms a red colour
 - D. a physical change in which nothing new is formed
18. The diagram below shows structures found in the human body. Which labelled structure is responsible for the formation of urea?

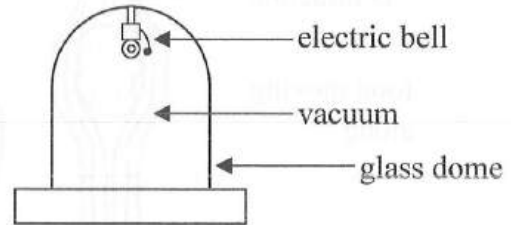


19. A bell is rung under a glass jar.

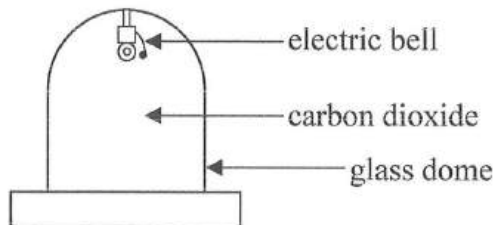
Which bell will make the quietest sound?



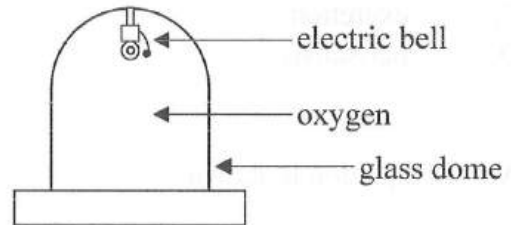
A



B

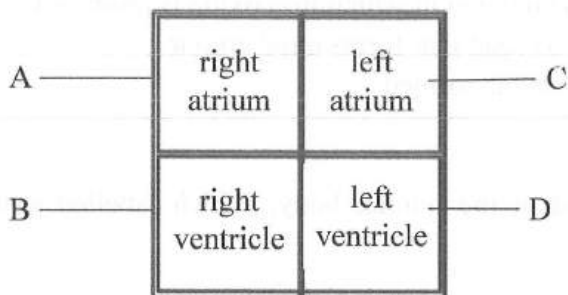


C



D

20. Which chamber in the human heart has the thickest wall?



21. Which shows the components of a solution?

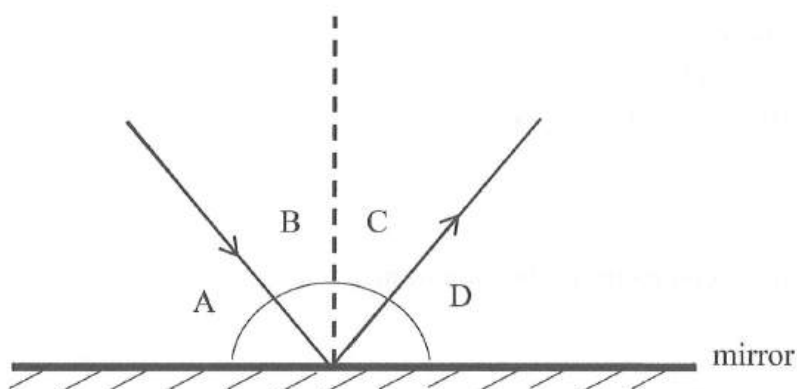
- A. a filtrate and a residue
- B. a solvent and a solute
- C. mixtures and compounds
- D. solids and liquids



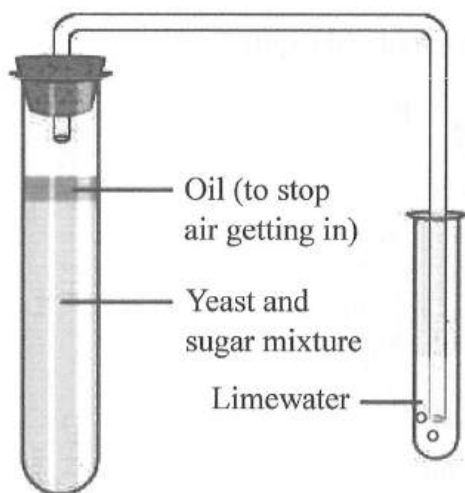
22. What is the name of the gas that must be present in order for aerobic respiration to take place?

- A. carbon dioxide
- B. nitrogen
- C. oxygen
- D. water vapour

23. Which is the angle of reflection for the light ray?



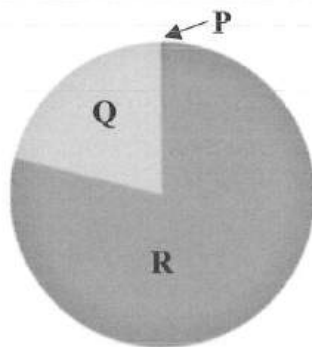
24. The diagram shows an experiment which is used to demonstrate anaerobic respiration in yeast.



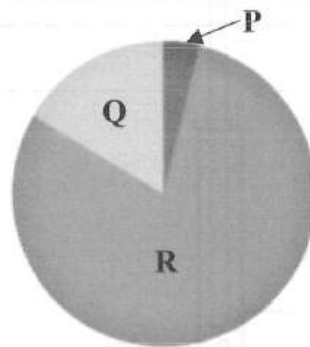
What would be the conclusion of this experiment if fermentation occurs?

- A. Carbon dioxide is produced turning limewater cloudy/milky.
- B. Ethanol is produced, limewater will remain clear.
- C. Glucose is produced turning limewater cloudy/milky.
- D. Lactic acid is produced.

25. What name is given to a mixture of metals?
- A. alloy
 - B. compound
 - C. ore
 - D. salt
26. Which is an example of a physical change?
- A. sugar cube cut into pieces
 - B. formation of manure from leaves
 - C. formation of a salt from an acid and a base
 - D. ripening of a fruit
27. Which shows the products of the complete combustion of methane?
- A. carbon + water
 - B. carbon dioxide + water
 - C. carbon monoxide + water
 - D. water
28. The diagram show the percentage of three gases in inspired and expired air.



inspired air



expired air

Which gas does **P** represent?

- A. argon
- B. carbon dioxide
- C. nitrogen
- D. oxygen



29. What is refraction?

- A. the bending of waves that occurs during a change in medium
- B. the bending of waves that occur when a barrier is encountered
- C. the bouncing back of waves when a barrier is encountered
- D. the spreading out of waves around obstacles and gaps

30. Which organ is correctly matched to its function?

	Organ	Function
A.	bladder	transports urine from the body
B.	kidney	breaks down toxins
C.	ureter	connects the bladder to the kidneys
D.	urethra	stores urine temporarily

31. Some properties of substance X are listed.

- It conducts electricity when molten.
- It has a high melting point.
- It burns in oxygen and the product dissolves in water to give a solution with pH11.

What is X?

- A. a covalent compound
- B. a metal
- C. a non-metal
- D. an ionic compound

32. Which body organ responds to temperature?

- A. ear
- B. eye
- C. heart
- D. skin

33. Which particles flow in a circuit to generate current?

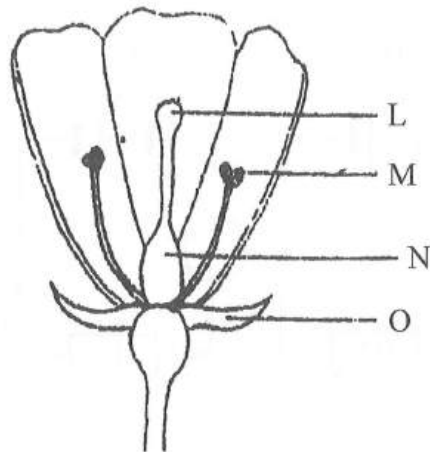
- A. protons
- B. neutrons
- C. atoms
- D. electrons

34. Which structure connects a bone to bone?
- A. cartilage
 - B. ligament
 - C. muscle
 - D. tendon
35. When a mixture of substances reacts chemically, what does an increase in temperature indicate?
- A. Bonds in the reactants are broken.
 - B. Heat energy is being absorbed during the reaction.
 - C. The products contain less energy than the reactants.
 - D. The reactants contain less energy than the products.
36. Which is **not** an effect of alcohol consumption?
- A. liver damage
 - B. loss of muscle coordination
 - C. poor self-control
 - D. stimulation of the nervous system
37. Which group contains only good electrical conductors?
- A. air, graphite, plastic
 - B. air, gold, mercury
 - C. copper, graphite, mercury
 - D. copper, gold, plastic



38. The diagram shows a section cut through a flower.

Identify where fertilisation and pollination occur on the diagram?



	Fertilisation	Pollination
A.	L	M
B.	M	N
C.	N	L
D.	O	L

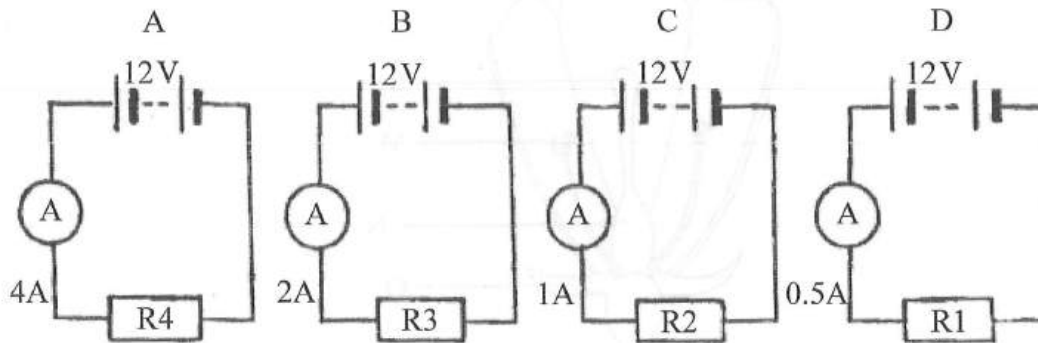
39. Sulphur dioxide, carbon monoxide and oxides of nitrogen are common gaseous pollutants found in air.

Which pollutants contribute most to acid rain?

- A. carbon monoxide and oxides of nitrogen
B. carbon monoxide and sulphur dioxide
C. oxides of nitrogen and sulphur dioxide
D. oxides of nitrogen only
40. What is the name of the structure which allows exchange of materials between mother and foetus?
- A. cervix
B. fallopian tube
C. placenta
D. uterus wall

41. The circuit diagrams show a 12 V battery connected to a resistor and an ammeter. The ammeter reading for each circuit is shown.

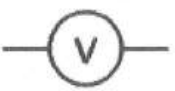
Which circuit has the lowest resistance?



42. Which group of organisms break down and feed on dead and decaying organisms?
- A. carnivores
 - B. decomposers
 - C. herbivores
 - D. producers
43. Which of the following pairs of substances are necessary for a piece of iron to rust?
- A. air and water
 - B. air and iron oxide
 - C. carbon dioxide and iron oxide
 - D. carbon dioxide and water
44. What may cause the rapid growth of plants in a lake?
- A. excess fertilisers
 - B. excess herbicides
 - C. low water pH
 - D. low water temperature



45. Which electrical symbol represents a device whose function is to measure the potential difference across a component?

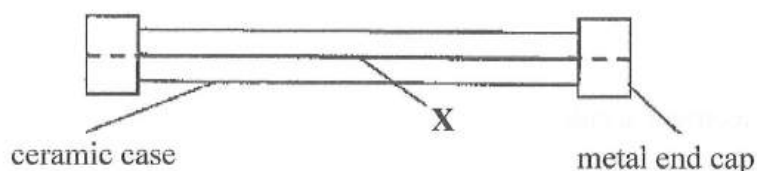
			
A.	B.	C.	D.

46. Which is **not** a respiratory condition caused by air pollution?

- A. asthma
- B. bronchitis
- C. emphysema
- D. gonorrhea

47. The diagram shows the structure of a fuse.

What is the purpose of the wire labelled X?



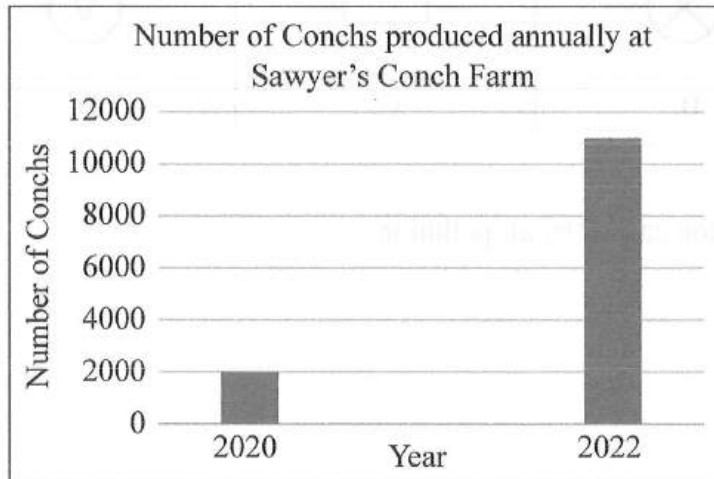
- A. to connect the end caps
- B. to ground the appliance
- C. to increase resistance
- D. to melt when current becomes too large

48. Which named plant is native to The Bahamas?

- A. aloe vera
- B. banana
- C. casuarina
- D. mahogany

49. Mr. Sawyer started a conch farm business in 2020.

Use the information from the graph to determine how many more conchs were produced in 2022 than in 2020?



- A. 8500
B. 9000
C. 9500
D. 10500
50. Which is a way to prevent an electrical accident?

- A. have contact with live wires
B. repair faulty power cords
C. use electrical equipment around water
D. use overloaded outlets



School Number	Candidate Number
Surname and Initials	

COMBINED SCIENCE

PAPER 2 3102/2

Wednesday **29 MAY 2024** 1:30 P.M.–3:00 P.M.

No additional materials required.

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided on this question booklet.

Answer **ALL** questions on this paper in the spaces provided in this question booklet.

Read each question carefully and make sure you know what you have been asked to do before starting your answer.

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

A copy of the Periodic Table is printed on page 2.

Calculators are permitted, however **NO** graphing calculators are allowed.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

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



The Periodic Table of the Elements

Group																			
I	II	III										IV	V	VI	VII	0			
1 H Hydrogen																			
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10		
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18		
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36		
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# 58-71 Lanthanoid series + 90-103 Actinoid series																			
140 Ce Cesium 58 141 Pr Praseodymium 59 144 Nd Neodymium 60 150 Sm Samarium 62 152 Eu Europium 63 157 Gd Gadolinium 64 159 Tb Terbium 65 162 Dy Dysprosium 66 165 Ho Holmium 67 167 Er Erbium 68 169 Tm Thulium 69 173 Yb Ytterbium 70 175 Lu Lutetium 71 232 Th Thorium 90 238 Pa Protactinium 91 238 U Uranium 92 238 Np Neptunium 93 238 Pu Plutonium 94 238 Am Americium 95 238 Cm Curium 96 238 Bk Berkelium 97 238 Cf Californium 98 238 Es Einsteinium 99 238 Fm Fermium 100 238 Md Mendelevium 101 238 No Nobelium 102 238 Lr Lawrencium 103																			

a

X

b

Key

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

1. The diagrams in Fig. 1.1 show the arrangement of atoms in four substances labelled A–C.

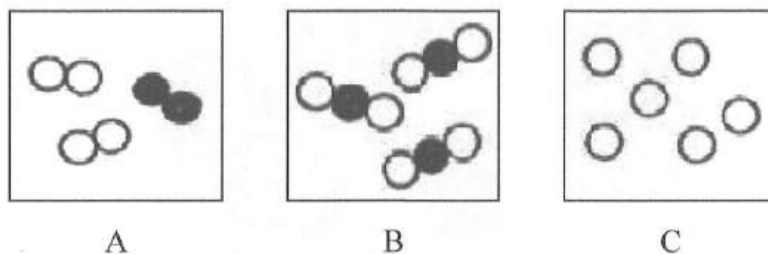


Fig. 1.1

- (a) Write the letter of the diagram that represents the substances shown and explain why.
- (i) A pure element _____
 Explanation _____ [2]
- (ii) A molecule _____
 Explanation _____ [2]
- (iii) A compound _____
 Explanation _____ [2]
- (b) (i) Write the letter of the diagram that represents a mixture.
 A mixture _____ [1]
- (ii) State three differences between a mixture and a compound.
- 1 _____

- 2 _____

- 3 _____
 _____ [3]

TOTAL MARKS [10]

[Turn over]

2. Fig. 2.1 shows the components of human blood.

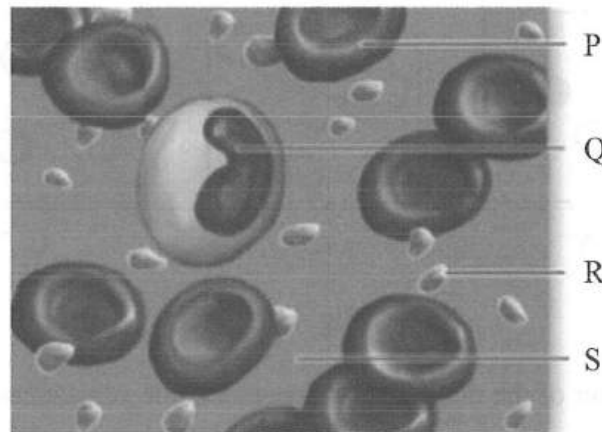


Fig. 2.1

- (a) State the names of the parts labelled:

P _____

Q _____

R _____

[3]

- (b) (i) Give the function of the structure labelled P

_____ [1]

- (ii) Describe the shape of P and explain how its shape helps it to carry out its function.

_____ [2]



- (c) Fig. 2.2 shows a part of a capillary network around some body cells.

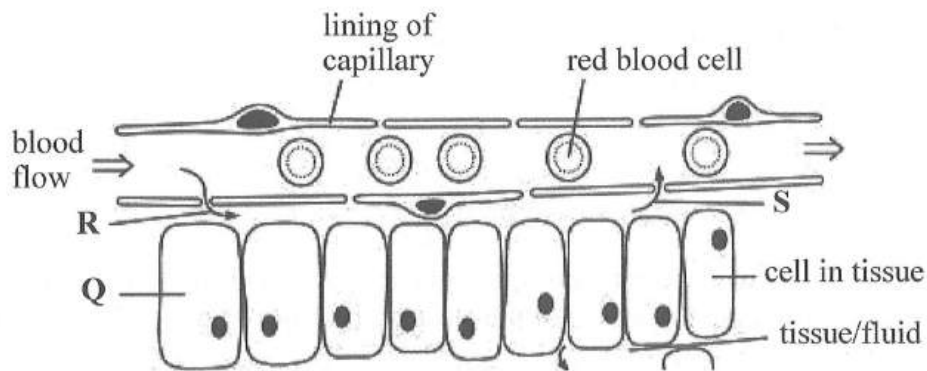


Fig. 2.2

- (i) State the structure and function of a capillary.

Structure: _____

Function: _____

[2]

- (ii) Fig. 2.2 shows tissue fluid surrounding the cells.

- Name two substances that pass from the capillary into the tissue fluid at R.

1 _____

2 _____

- Name two substances that pass out of the tissue fluid into the capillary at S.

1 _____

2 _____

[2]

TOTAL MARKS [10]

3. This question is about electric charge and current.

(a) State the law of attraction of electric charges.

[1]

(b) When a positively charged rod is brought near a neutral electroscope but does not touch the electroscope, the leaves of the electroscope move apart, as shown in Fig. 3.1.

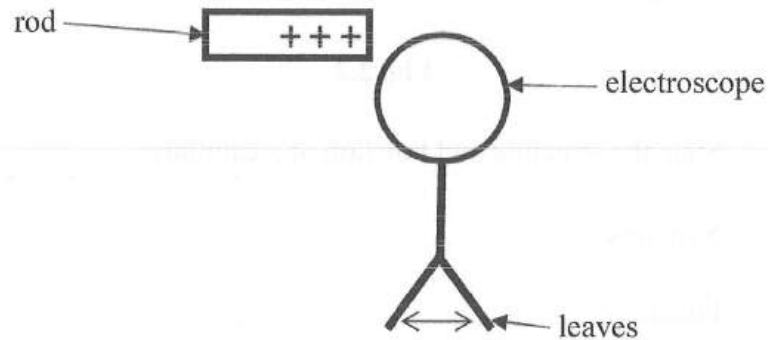


Fig. 3.1

(i) Explain why this happens.

[3]

(ii) During a long car journey, a driver can become electrostatically charged.

Explain what causes the driver to become charged.

[2]



- (c) An ammeter in an electric circuit displays the reading shown in Fig. 3.2.

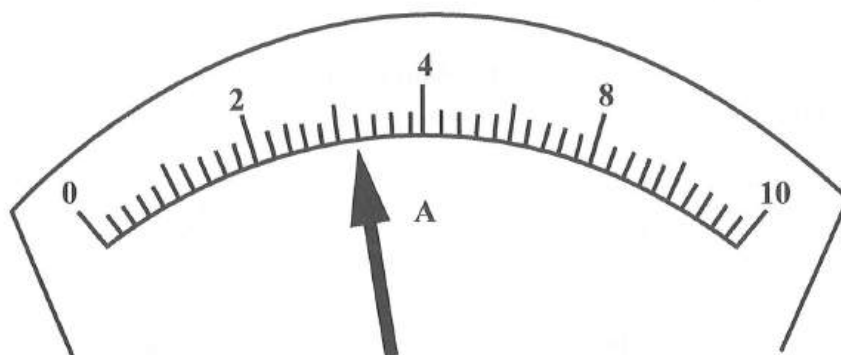


Fig. 3.2

- (i) State the reading on the ammeter.

_____ amps

[1]

- (ii) Calculate the amount of charge that flows through the circuit in 2 minutes.

State the formula used and give the units.

Show your working.

[3]

TOTAL MARKS [10]

4. Fig. 4.1 shows the carbon cycle. The concentration of carbon dioxide in the atmosphere is controlled by several processes.

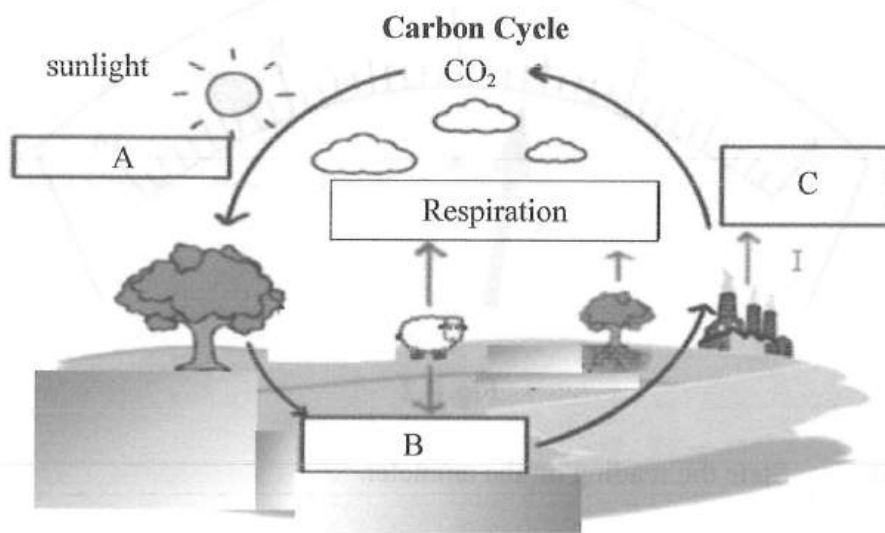


Fig. 4.1

- (a) Name the missing processes that are represented by the boxes labelled **A**, **B** and **C** in Fig. 4.1.

Process **A** _____

Process **B** _____

Process **C** _____ [3]

- (b) There are two kinds of respiration: aerobic and anaerobic.

Anaerobic respiration takes place in the brewing of alcoholic beverages or fermentation.

Write the word equation to show the reactants and products in fermentation.

_____ [2]

- (c) The gradual increase in carbon dioxide concentration in the atmosphere is a concern to the Government of The Bahamas.

- (i) Give **two** reasons why the concentration of carbon dioxide in the atmosphere is gradually increasing.

1 _____

2 _____

[2]



- (ii) Explain how the seas and oceans can decrease the concentration of carbon dioxide in the atmosphere.

[3]

TOTAL MARKS [10]

5. This question is about osmosis.

Fig. 5.1 shows what happens when a plant cell is placed in water.

Fig. 5.2 shows what happens when a plant cell is placed in a concentrated salt solution.

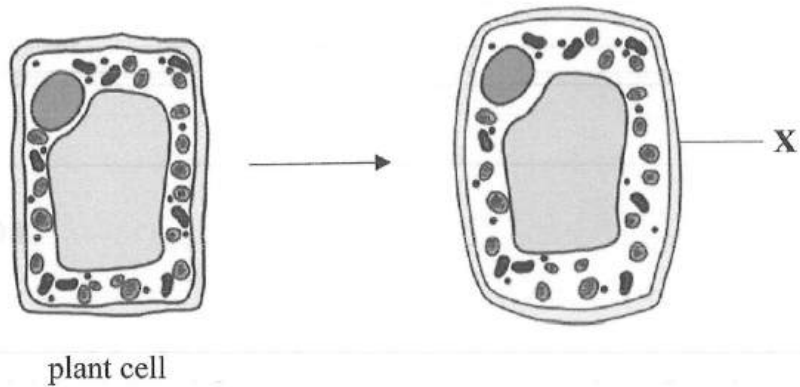


Fig. 5.1

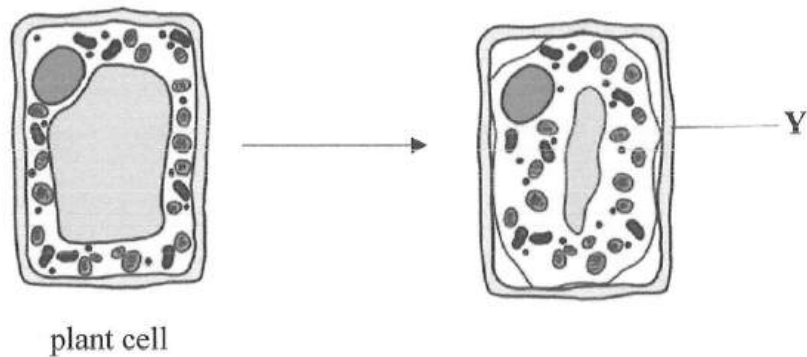


Fig. 5.2

- (a) (i) Name the process occurring in the diagrams.
_____ [1]
- (ii) State one characteristic of the cell that allows the process in (a) (i) to occur.
_____ [1]
- (iii) State the term that describes cell X in Fig. 5.1.
_____ [1]



- (iv) State the term that describes cell Y in Fig. 5.2.

_____ [1]

- (v) Describe the changes that occur as the plant cell is placed in concentrated salt solution as shown in Fig. 5.2.

_____ [2]

- (b) In an experiment, an animal cell is placed in water.

- (i) Describe what happens to the animal cell when it is placed in water.

_____ [2]

- (ii) A solution that is at the same concentration as the animal cell is described as isotonic.

Explain what would happen to the animal cell if it was placed in an isotonic solution.

_____ [2]

TOTAL MARKS [10]

6. In a ripple tank experiment, water waves are produced. Fig. 6.1 shows a water wave.

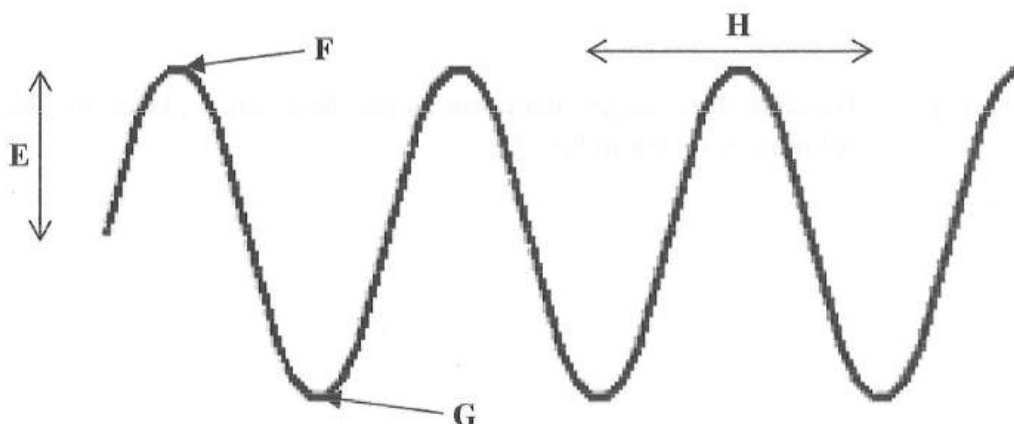


Fig. 6.1

- (a) Identify the properties of the wave labelled.

- (i) E _____ [1]
(ii) F _____ [1]
(iii) G _____ [1]
(iv) H _____ [1]

- (b) A water wave is a transverse wave.

- (i) Give another example of a transverse wave.

_____ [1]

- (ii) Describe how transverse waves move.

_____ [2]

- (c) The speed of a wave is 340 m/s and the wavelength is 5 meters.

Calculate the frequency of this wave.

Show your working and include the unit.

[3]

TOTAL MARKS [10]



7. The table shows the causes of HIV infection among a group of individuals with AIDS.

Cause of HIV infection	Number of people with AIDS
Sexual intercourse	13500
Blood transfusion	1500
Mother to infant	788
Other	2300

- (a) (i) Give the meaning for the abbreviation 'HIV'.
 _____ [1]
- (ii) Explain **two** ways how HIV can be passed from mother to infant.
 1 _____
 2 _____ [2]
- (iii) Suggest the likely cause of the HIV infection listed as other in the table.
 _____ [1]
- (b) (i) Calculate the percentage of people that were infected with AIDS through sexual intercourse. (Show your working.)
 _____ [2]
- (ii) State one method of contraception, that if used effectively will prevent the spread of AIDS via sexual intercourse.
 _____ [1]
- (c) Gonorrhea is another disease that is transmitted during sexual intercourse.
- (i) Name the kind of organism that causes gonorrhea.
 _____ [1]
- (ii) Identify **two** signs of gonorrhea.

 _____ [2]

TOTAL MARKS [10]

[Turn over



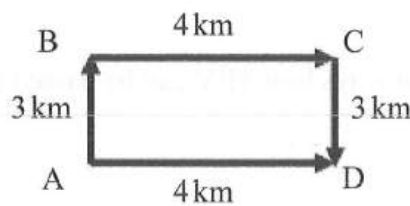
8. This question is about speed, velocity, and acceleration.

(a) Define velocity.

[2]

(b) A student takes a walk starting at point A and ending at point D.

Their path (A → B → C → D) is shown below.



Determine:

(i) the total distance travelled between A and D.

[1]

(ii) The student total time taken for the walk was 2 hours and 15 minutes.

Calculate the average speed of the student in meters per second (m/s).

[3]

(iii) The distance the student travels and the displacement are not the same.

Give the difference between distance and displacement.

[2]



- (c) A student investigates the speed of cars. They measure the time it takes to travel a distance of 80 m.

State two measuring instruments the student should use.

1 _____

2 _____

[2]

TOTAL MARKS [10]

15/11/18

End]

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School Number	Candidate Number
Surname and Initials	

COMBINED SCIENCE

PAPER 3 3102/3

Wednesday **5 JUNE 2024** 9:00 A.M.–10:30 A.M.

Additional materials:
Graph paper

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided on this question booklet.

Answer **ALL** questions in **Section A** (1 – 4) in the spaces provided.

Answer **ANY** two (2) out of the three [3] questions from **Section B** on the lined pages provided in this booklet.

Candidates are advised to spend no more than 35 minutes on Section A.

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

A copy of the Periodic Table is printed on page 2.

Calculators are permitted, however, **NO** graphing calculators are allowed.

For Examiner's Use	
SECTION A	
1	
2	
3	
4	
SECTION B	
5	
6	
7	
TOTAL	

This question paper consists of 16 printed pages and 4 lined pages.



The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
1 H Hydrogen																	
7 Li Lithium 3																	
	9 Be Beryllium 4																
23 Na Sodium 11																	
	24 Mg Magnesium 12																
39 K Potassium 19																	
	40 Ca Calcium 20																
85 Rb Rubidium 37																	
	88 Sr Strontium 38																
133 Cs Caesium 55																	
	137 Ba Barium 56																
87 Fr Francium 87																	
	226 Ra Radium 88																
57 La Lanthanum																	
89 Y Yttrium																	
91 Zr Zirconium 40																	
93 Nb Niobium 41																	
95 Mo Molybdenum 42																	
96 Tc Technetium 43																	
101 Ru Ruthenium 44																	
103 Rh Rhodium 45																	
106 Pd Palladium 46																	
108 Ag Silver 47																	
112 Cd Cadmium 48																	
115 In Indium 49																	
119 Sn Tin 50																	
122 Sb Antimony 51																	
127 I Iodine 53																	
128 Te Tellurium 52																	
131 Xe Xenon 54																	
139 La Lanthanum																	
141 Pr Praseodymium 59																	
144 Nd Neodymium 60																	
150 Sm Samarium 62																	
152 Eu Europium 63																	
157 Gd Gadolinium 64																	
159 Tb Terbium 65																	
162 Dy Dysprosium 66																	
165 Ho Holmium 67																	
167 Er Erbium 68																	
169 Tm Thulium 69																	
173 Yb Ytterbium 70																	
175 Lu Lutetium 71																	
222 Th Thorium 90																	
232 Pa Protactinium 91																	
238 U Uranium 92																	
244 Pu Plutonium 94																	
252 Am Americium 95																	
261 Cm Curium 96																	
269 Bk Berkelium 97																	
277 Lr Lawrencium 103																	

a

X

b

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

*58-71 Lanthanoid series

†90-103 Actinoid series

a

X

b

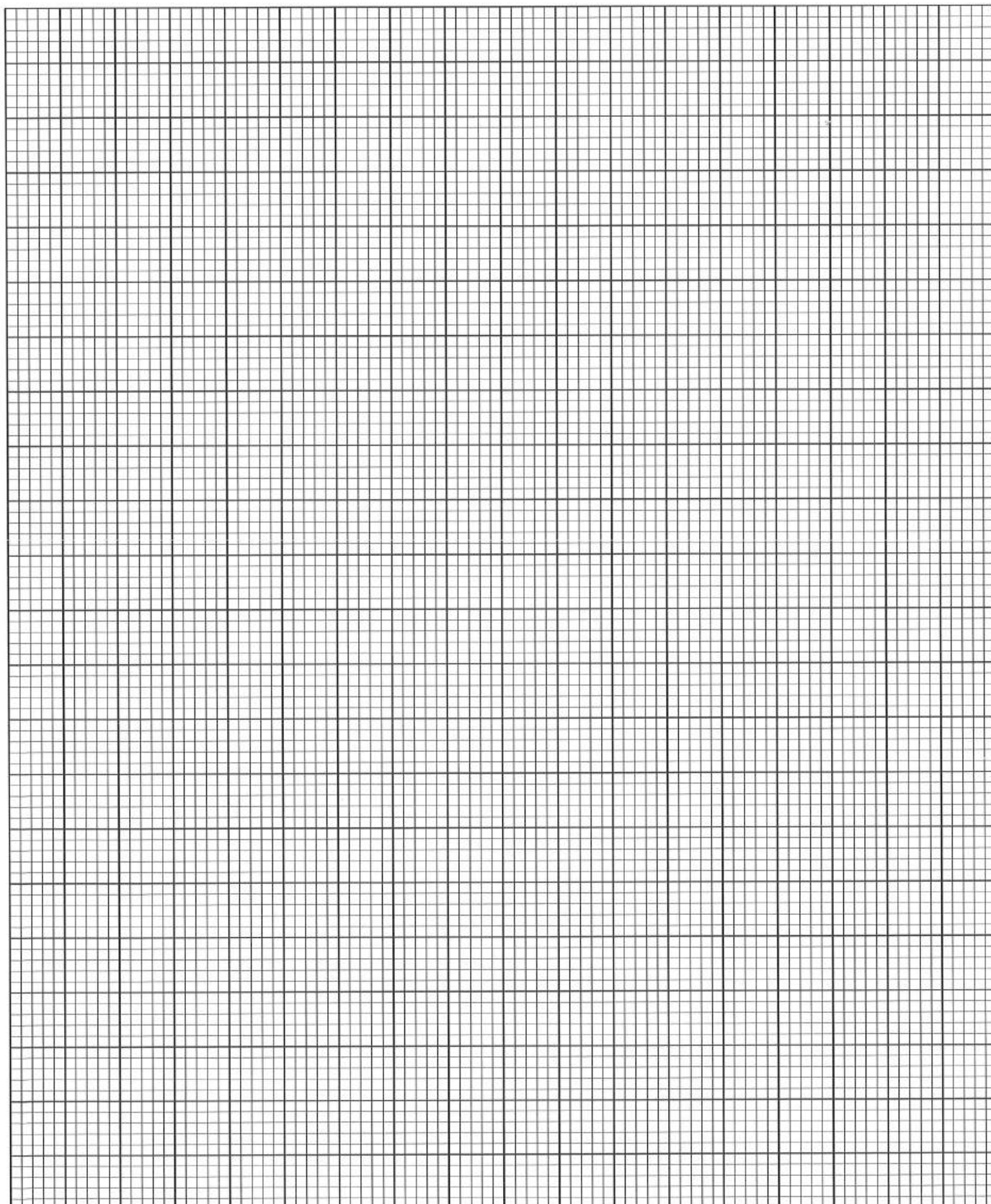
a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

**BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION
EXAMINATION**

School No.	Candidate No.	Level:	For Examiner's Use
Subject Number & Title:		Paper:	
Surname & Initials:		Section:	
Signature:	Date:	Qu. No.	



EXAMINATION

School No.	Candidate No.		Level:	For Examiner's Use
Subject Number & Title:			Paper:	
Surname & Initials:			Section:	
Signature:		Date:	Qu. No.	

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are no margins, text, or other markings on the page.

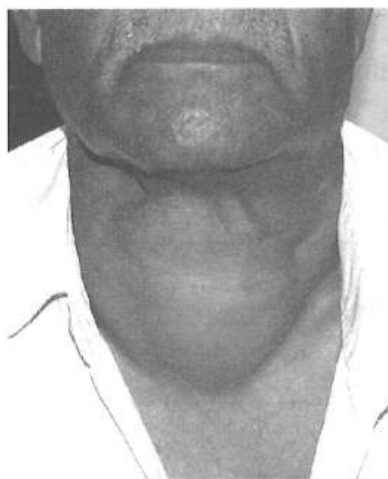
SECTION A

Answer **ALL** questions in this Section.

1. The pictures show two symptoms of deficiency diseases.



Picture A



Picture B

- (a) In Table 1.1, write the name of the deficiency disease shown in pictures A and B and the nutrient that is lacking.

Table 1.1

	Picture A	Picture B
Deficiency disease		
Nutrient lacking		

[2]

- (b) Scurvy is another deficiency disease. State the cause and give one symptom of this disease.

Cause _____

Symptom _____

[2]

- (c) Define the term balanced diet.

_____ [2]

[Turn over

- (d) Suggest the name of the condition caused when a person is overweight and eats more food than required for normal activities.

_____ [1]

- (e) About two thirds of the world's population suffers from malnutrition.

Define malnutrition and suggest **one** solution on how to get rid of food shortage.

Definition: _____

Solution: _____

[3]

TOTAL MARKS [10]



2. A student used the apparatus set-up in Fig. 2.1 to investigate the effect of increasing the concentration on the rate of reaction.

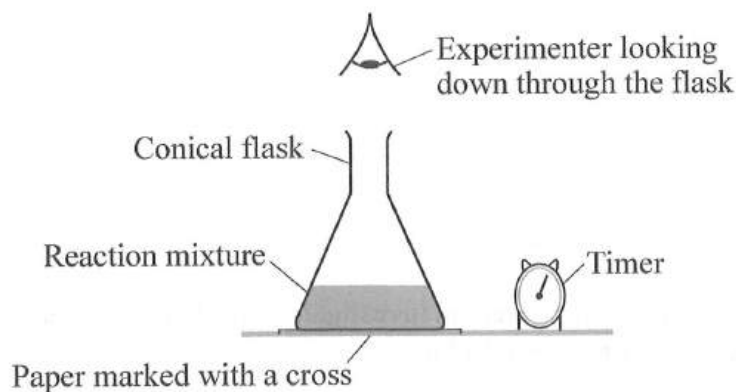


Fig. 2.1

The student uses 10 cm^3 of hydrochloric acid and the following volumes of sodium thiosulphate and distilled water.

The time taken for the sulphur precipitate to form and make the cross disappear from view is measured and recorded.

Table 2.1

Experiment	1	2	3
Volume of sodium thiosulphate/ cm^3	10	20	
Volume of water added/ cm^3	40	30	
Time taken for cross to disappear/s	56	28	

- (a) (i) In experiment 3 the student wanted the concentration of the sodium thiosulphate to be double the concentration used in experiment 2.

Complete Table 2.1 to show the **volumes** which should be used and the expected **time** taken for the cross to disappear from view in experiment 3. [2]

- (ii) In terms of particles and collisions, explain the effect of increasing the concentration of sodium thiosulphate on the rate of reaction.

[3]

- (b) In another experiment a student investigated the effect of a catalyst on the rate of reaction using the apparatus shown in Fig. 2.2

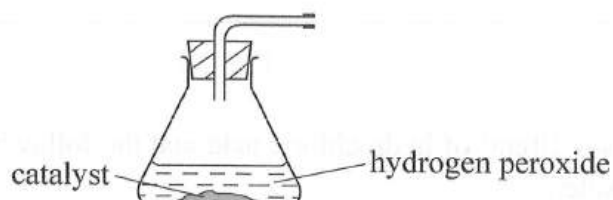
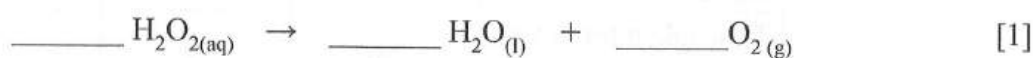


Fig. 2.2

The student uses 50 cm^3 of hydrogen peroxide and 1.0 g of the catalyst manganese(IV) oxide.

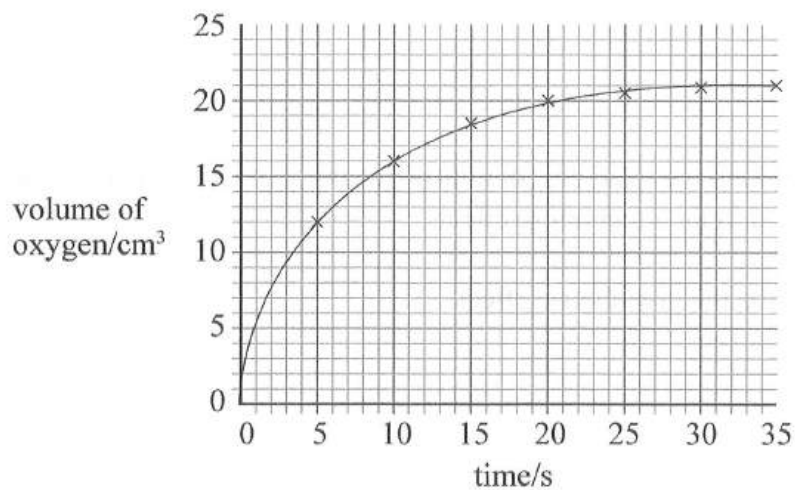
In the reaction, hydrogen peroxide decomposes to produce water and oxygen.

- (i) Place the correct numbers in the blanks to balance the chemical equation showing the decomposition of hydrogen peroxide.



The volume of oxygen given off in the reaction was measured at intervals.

The graph shows the results.



- (ii) Using information from the graph describe the changes in the rate of the reaction from 0 to 15 seconds and 20 to 35 seconds.

- Changes in the rate of the reaction from 0 to 15 seconds

- Changes in the rate of the reaction from 20 to 35 seconds

[2]

- (iii) Explain how a catalyst increases the rate of a reaction.

[2]

TOTAL MARKS [10]

3. This question is about major sources of energy and alternative energy sources.

- (a) Define the term non-renewable source of energy.

_____ [1]

- (b) Fossil fuels are examples of non-renewable sources of energy. The use of fossil fuels have resulted in the greenhouse effect.

Describe the greenhouse effect.

_____ [3]

- (c) Natural resources can be used as alternative sources of energy.

Identify the alternative source of energy for each description:

Energy from the sun _____

Energy from the nucleus _____
of an atom

Heat energy from the earth _____

Energy due to flowing water _____

[4]



- (d) Wind energy has been proposed as an alternative source of energy for The Bahamas.

State **one** advantage and **one** disadvantage of using wind energy as a main source of energy.

● Advantage _____

● Disadvantage _____

[2]

TOTAL MARKS [10]



4. Janae spilt some hydrochloric acid on the lab desk. She looked at the possibility of neutralising it with one of five chemicals. The properties of these chemicals are summarised in Table 4.1.

Table 4.1

Chemical	pH	Reaction with acid
A	1	None
B	7	None
C	4	None
D	13	Produces a salt and water
E	8	Produces a salt, water and carbon dioxide

- (a) Explain the meaning of the term neutralise.

_____ [2]

- (b) (i) Explain why chemical A would not be suitable for neutralising the hydrochloric acid on the lab desk.

_____ [1]

- (ii) State the chemical you would recommend Janae to use to neutralise the acid spilled on the desk.

Give a reason for your answer,

Chemical _____ [1]

Reason _____

_____ [1]



- (c) State the colour of universal indicator in chemical **B**, chemical **C** and chemical **E**.

chemical **B** _____

chemical **C** _____

chemical **E** _____

[3]

- (d) Write the formula of the ion responsible for the acidic and alkaline properties of a substance.

Acidic _____

Alkaline _____

[2]

TOTAL MARKS [10]

SECTION B

Answer **any** two out of the three questions on the lined pages at the end of this booklet.

5. Fig 5.1 shows a villus.

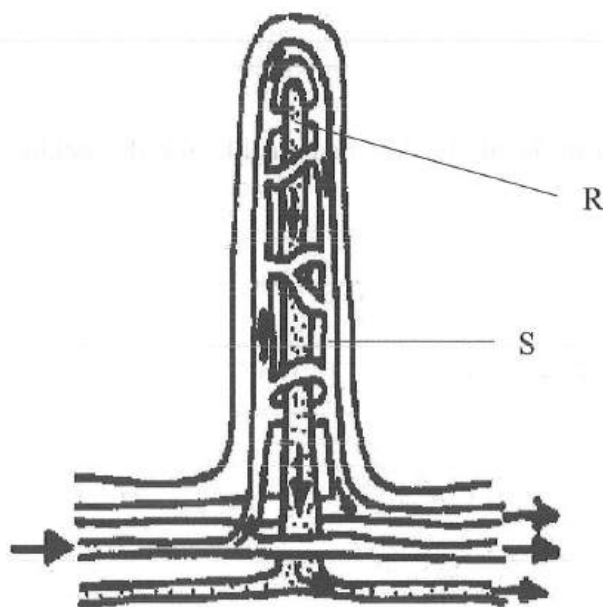


Fig 5.1

- (a) (i) Name the part of the digestive system where the villus is found. [1]
- (ii) Explain why it is important to have a large number of villi. [2]
- (b) Digested substances are absorbed into the vessels labelled R and S.
- Identify:
- two substances absorbed in vessel R.
 - two substances absorbed in vessel S.
- [4]
- (c) Chemical reactions which are vital to life could not take place quickly without the use of enzymes.
- (i) Define the term enzyme. [1]



- (ii) Complete Table 5.1 to show an enzyme associated with the digestion of protein and fat.

Table 5.1

Substance Digested	Enzyme
Protein	
Fat	

[2]

- (iii) A substance produced in the liver works along with the enzyme to aid in the digestion of fat.

Name the substance and explain why it is needed to help with the digestion of fat.

[3]

- (d) Six test-tubes containing a mixture of starch and amylase in water are kept at different temperatures. The time taken for the starch to be broken down was measured.

The results are shown in the Table 5.2.

Table 5.2

Test-tube	Temperature/°C	Time it takes for starch to be digested/minutes
1	15	32
2	20	18
3	30	7
4	35	3
5	40	10
6	50	35

- (i) Plot a line graph using the data shown in Table 5.2.

[4]

- (ii) State the temperature at which starch is broken down the fastest.

[1]

- (iii) Describe the relationship between temperature and the rate of starch digestion.

[2]

TOTAL MARKS [20]

Question

Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[Turn over

Question

Write on both sides of the paper

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be from a notebook or a standard ruled sheet of paper. There is no handwriting or other markings on the page.