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COMBINED SCIENCE

PAPER 1

Monday **2 JUNE 2003** 12.30 – 2.00 P.M.

Additional materials:

Answer Booklet for Section B

Graph paper

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

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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 above and on the answer booklet.

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

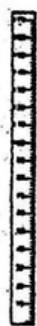
Answer ANY two (2) out of three (3) questions from Section B in the answer booklet provided which must be attached to the back of the question booklet.

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

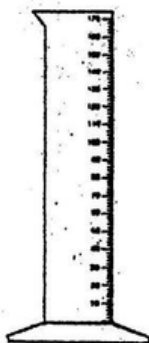
The mark for each part question is given in brackets [].

This question paper consists of 18 printed pages and 2 blank pages.

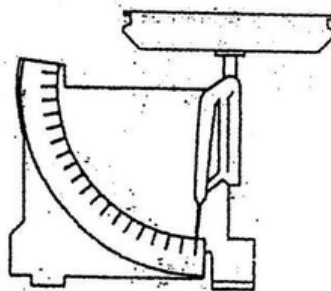
1. Which piece of apparatus is used to find the mass of a solid?



A



B

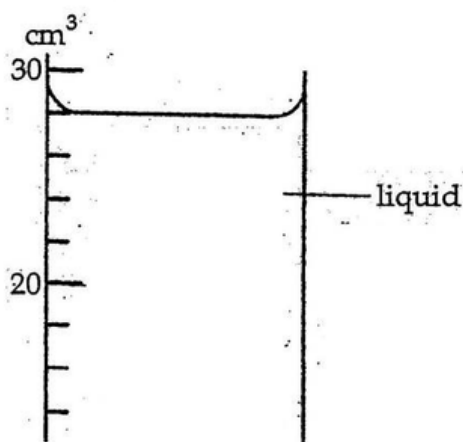


C



D

2. The diagram shows the level of liquid in a measuring cylinder.



What is the volume of the liquid?

A 24 cm³

B 28 cm³

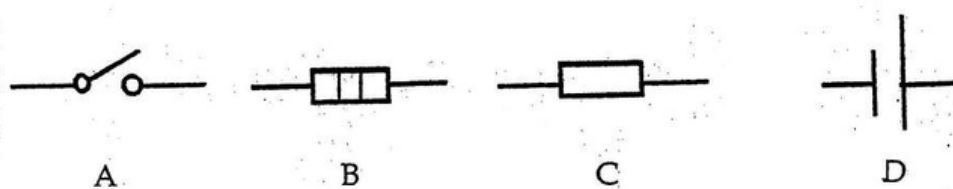
C 29 cm³

D 32 cm³

3. At which level of organization is the stomach?

- A cell
- B organ
- C system
- D tissue

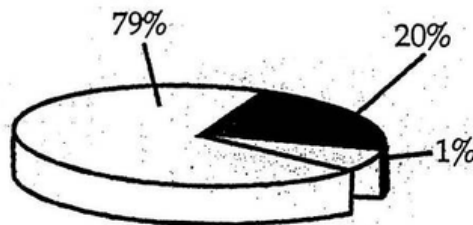
4. Which is the symbol for a cell?



5. Which form of energy is stored in a battery?

- A chemical
- B electrical
- C kinetic
- D light

6. The diagram below shows the approximate percentage of gases in the atmosphere.

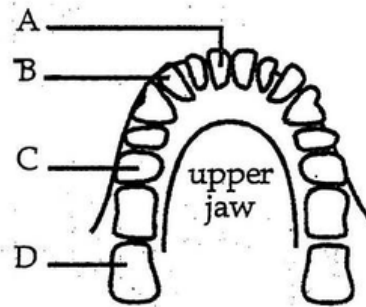


Which gas makes up 79% of the atmosphere?

- A carbon dioxide
- B nitrogen
- C oxygen
- D sulphur dioxide

7. The diagram shows the teeth in a man's upper jaw.

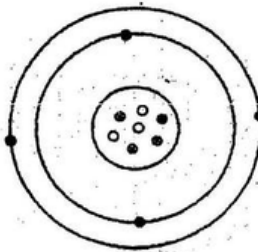
Which letter shows a canine tooth?



8. Which process occurs only in plants?

- A excretion
- B photosynthesis
- C respiration
- D reproduction

9. The diagram represents the structure of an atom of an element.



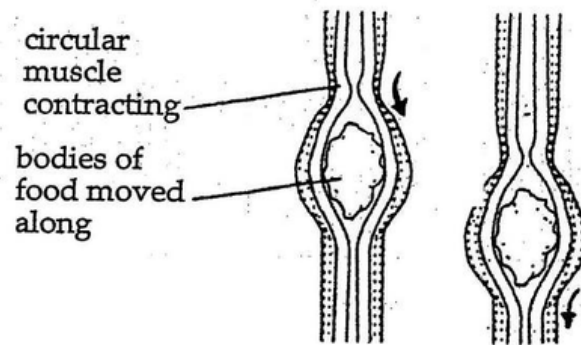
What is the atomic mass of this element?

- A 3
- B 4
- C 7
- D 11

10. Which gas is produced when hydrochloric acid reacts with zinc?

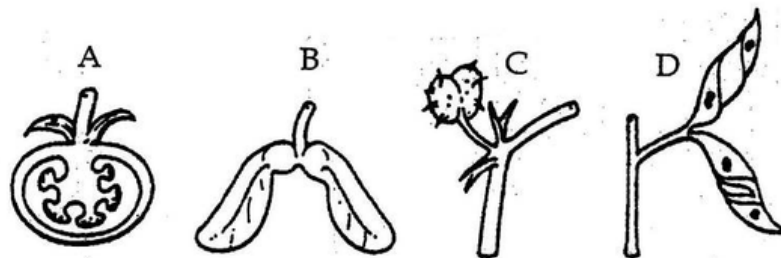
- A carbon dioxide
- B chlorine
- C hydrogen
- D oxygen

11. Which process is shown in the diagram of the oesophagus (gullet)?

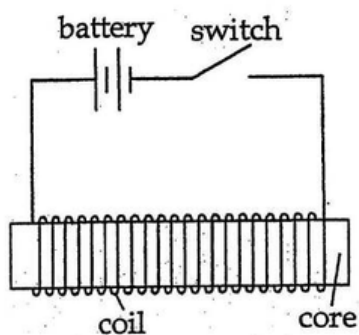


- A assimilation
- B chewing
- C egestion
- D peristalsis

12. Which seed is dispersed by an explosive mechanism?



13. The diagram shows an electromagnet.

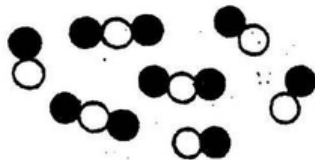


If the current is increased what effect would this have on the strength of the magnet?

- A becomes zero
 - B decreases
 - C increases
 - D remains the same
14. Which substance has ionic bonds?

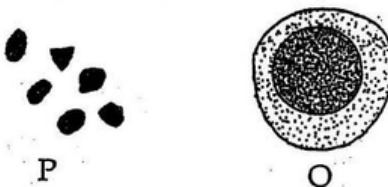
- A CH_4
- B H_2O
- C NaCl
- D NH_3

15. The sketch below represents the arrangements of atoms in a substance.



What is the substance likely to be?

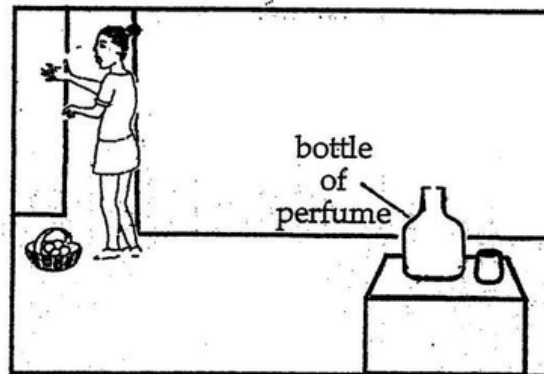
- A A compound
 - B A mixture of compounds
 - C A mixture of elements
 - D An element
16. The diagram shows TWO components of blood.



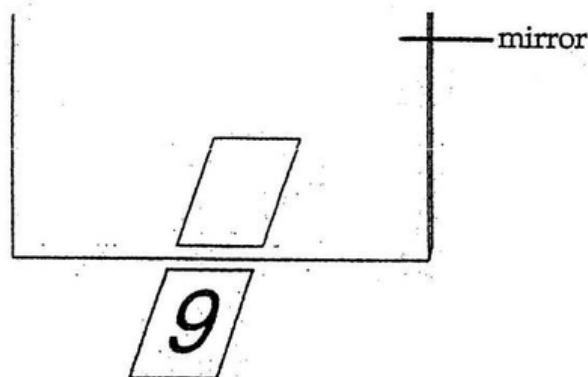
What are the functions of these components?

	P	Q
A	causes blood to clot	produces antibodies
B	carries oxygen	causes blood to clot
C	engulfs bacteria	carries oxygen
D	produces antibodies	engulfs bacteria

17. The diagram shows an open bottle of perfume in a room. Which process will cause the person at the other end of the room to smell the perfume?



- A conduction
B diffusion
C evaporation
D osmosis
18. The number 9 was drawn on a piece of paper and placed in front of a plane mirror as shown.



Which image would be seen in the mirror?



A



B

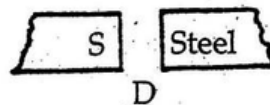
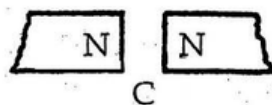
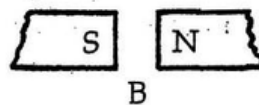
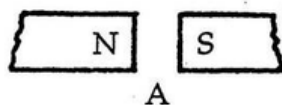


C

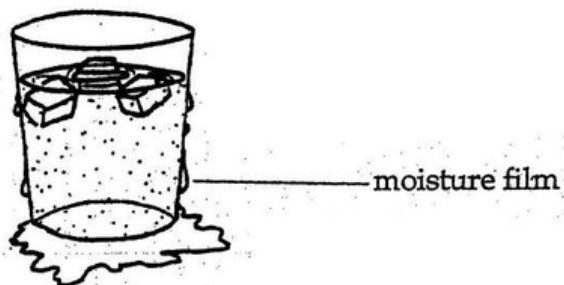


D

19. Which arrangement of magnets would produce repulsion?



20. The diagram shows a glass of ice and water?



Which process causes the moisture film to form?

- A condensation
 - B evaporation
 - C melting
 - D sublimation
21. Listed are **FOUR** substances you find in a kitchen with their approximate pH values.

Substances		pH
A	baking soda	9
B	water	7
C	salt water	7
D	vinegar	3

Which substance can neutralize ammonia solution?

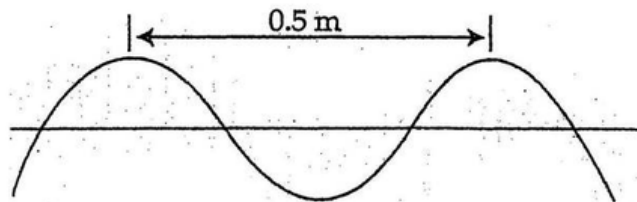
22. Which is a biological catalyst?

- A antibody
- B enzyme
- C hormone
- D solvent

23. How is alcohol classified?

- A depressant
- B hallucinogen
- C sedative
- D stimulant

24. The diagram represents a transverse wave.



What is the speed of the wave if its frequency is 2 Hz?

- A 1.0 m/s
- B 1.5 m/s
- C 2.5 m/s
- D 10.0 m/s

25. Magnesium + oxygen $\rightarrow$ magnesium oxide

Why is this reaction a chemical change?

- A a new substance has been formed
- B all reactions produce light
- C oxygen is present in the air
- D there is no change in mass

26. Which reaction absorbs heat energy?

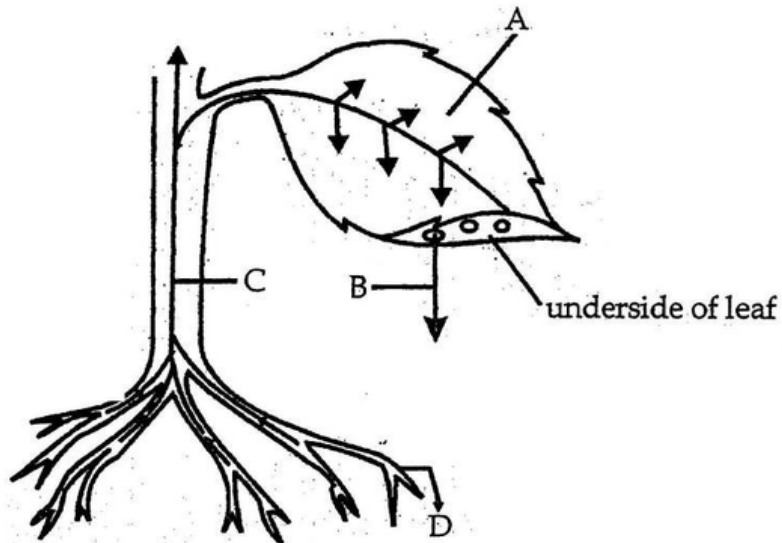
- A an endothermic reaction
- B an exothermic reaction
- C combustion of fuels
- D oxidation of glucose

27. The table lists **FOUR** substances that can be found in water.

substance		source
A	chlorine	added to water for purification
B	detergent	dissolved in water from homes and factories
C	fertilizer	dissolves from plant food
D	sand	rain washes it into river

Which substance can be removed from the water by filtration?

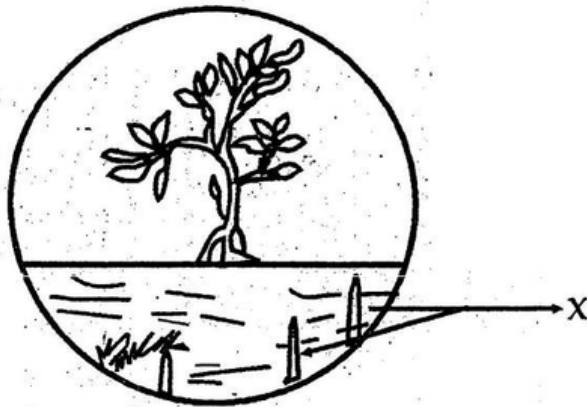
28. The diagram shows the pathway of water through a plant:



Where does transpiration occur?

29. For which purpose are the structures labelled X on the mangrove plant adapted?

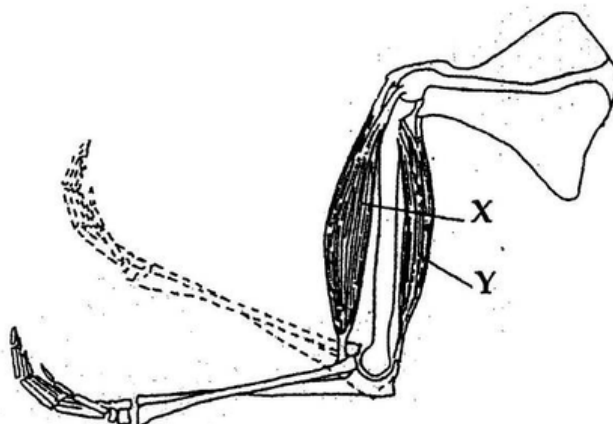
- A gaseous exchange
- B destroys coral reef
- C photosynthesis
- D transpiration



30. What undesirable effect does bleach have when used to catch lobsters?

- A causes bacteria to grow rapidly
- B destroys the coral reefs
- C produces an excessive amount of carbon
- D produces an excessive amount of fungus

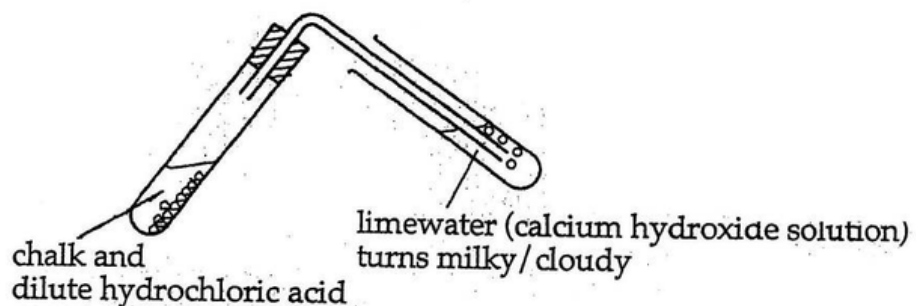
31. The diagram shows muscles in a human arm.



What happens to muscles X and muscles Y when the lower arm is lowered?

	X	Y
A	contracts	contracts
B	contracts	relaxes
C	relaxes	contracts
D	relaxes	relaxes

32. The diagram shows how a gas may be identified.



Which gas will this test identify?

- A ammonia
- B carbon dioxide
- C hydrogen
- D sulphur dioxide

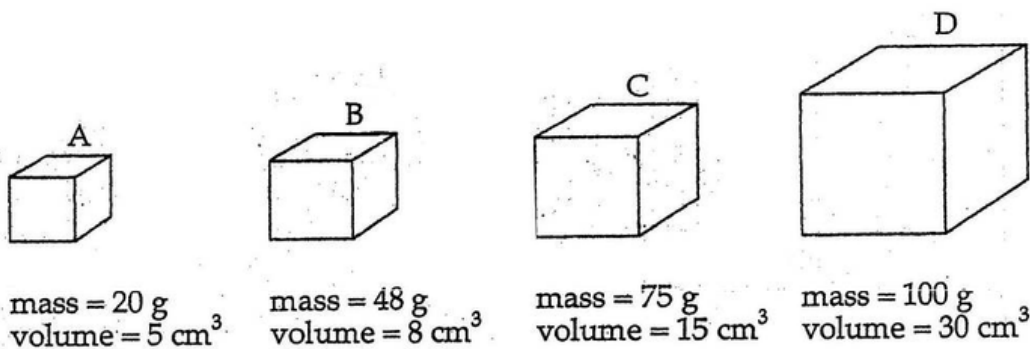
33. Which air pollutant is responsible for acid rain?

- A carbon monoxide
- B carbon dioxide
- C ozone
- D sulphur dioxide

34. Power is a measure of the

- A force which produces motion.
- B rate of change of energy
- C rate of change of momentum
- D total work done.

35. The diagram shows four cubes.



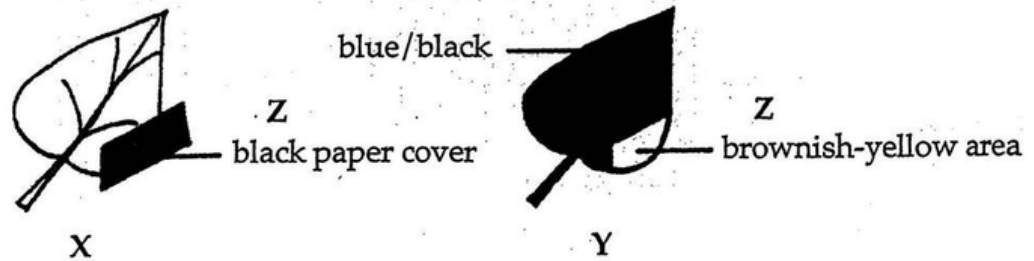
Which cube has the greatest density?

36. A newly discovered organism is classified. It is made of fine threads (hyphae), reproduces by spores and feeds saprophytically.

To which kingdom does this organism belong?

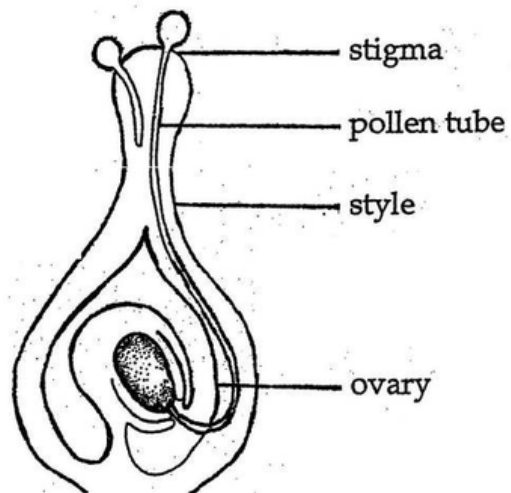
- A fungi
- B monera
- C protista
- D plant

37. Diagram X shows a leaf in which area Z was partially covered. Diagram Y shows a result of a starch test on the same leaf one week later.



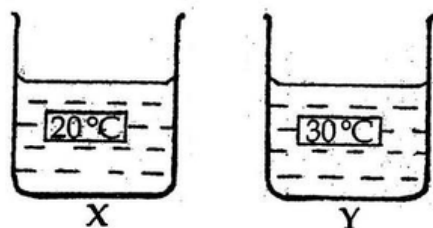
Why is the area Z not blue/black in colour?

- A absence of starch
 - B absence of light
 - C presence of light
 - D presence of starch
38. What process is shown occurring in the diagram below?



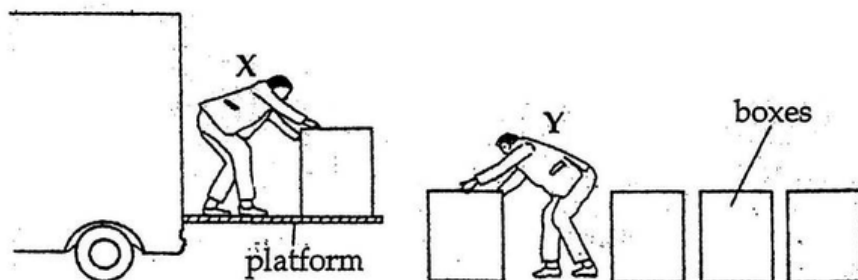
- A Dispersal
- B Fertilization
- C Germination
- D Pollination

39. The diagram shows **TWO** beakers containing water at a temperature of 20 °C and 30 °C respectively.



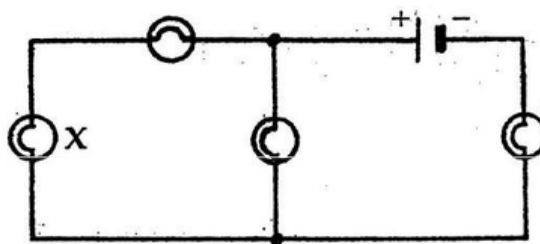
- Compared with the molecules in beaker X, the molecules in Y have
- A more energy and move slower.
 - B more energy and move faster.
 - C the same energy and same speed.
 - D less energy to evaporate.
40. Iron nails are often coated with paint or zinc metal to stop rusting. One purpose of the coating is to stop iron coming into contact with
- A carbon dioxide.
 - B hydrogen.
 - C nitrogen.
 - D oxygen.

41. Two workers X and Y are lifting boxes of equal weight onto a van.



Which quantity will **NOT** affect the total amount of work done by worker Y?

- A the height of the platform above the ground
 - B the number of boxes lifted
 - C the time taken to lift the boxes
 - D the weight of the boxes
42. The diagram shows a circuit in which all the lamps are lit

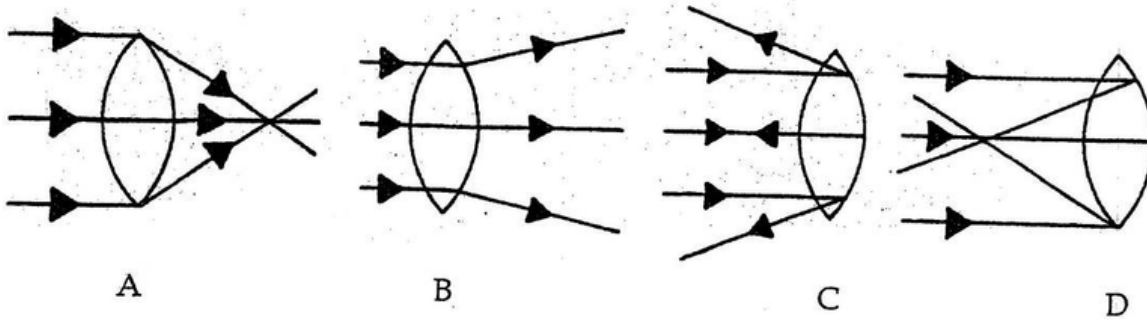


The bulb marked X blows and breaks part of the circuit.

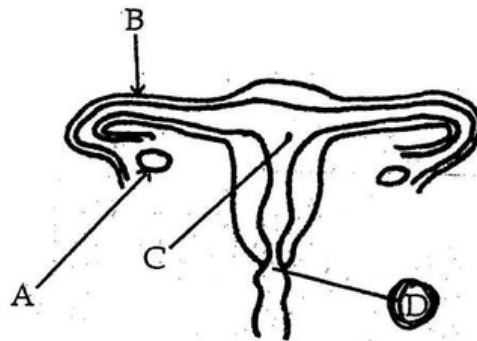
How many lamps will remain on?

- A 0
- B 1
- C 2
- D 3

43. Which diagram correctly shows what happens when light rays strike a convex lens?

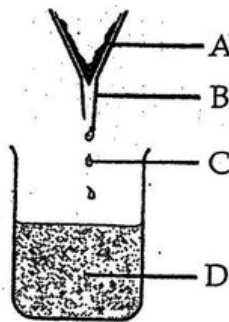


44. The diagram shows the female reproductive system of a mammal.



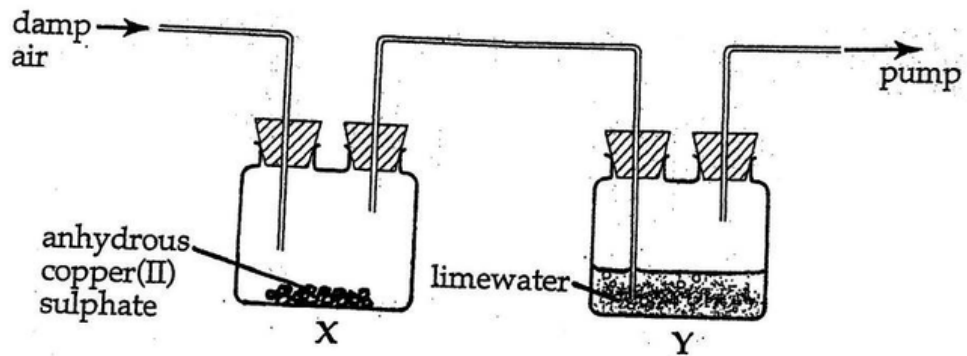
Where would a doctor place a diaphragm?

45. The diagram illustrates a method of separating a mixture.



Which letter labels the residue?

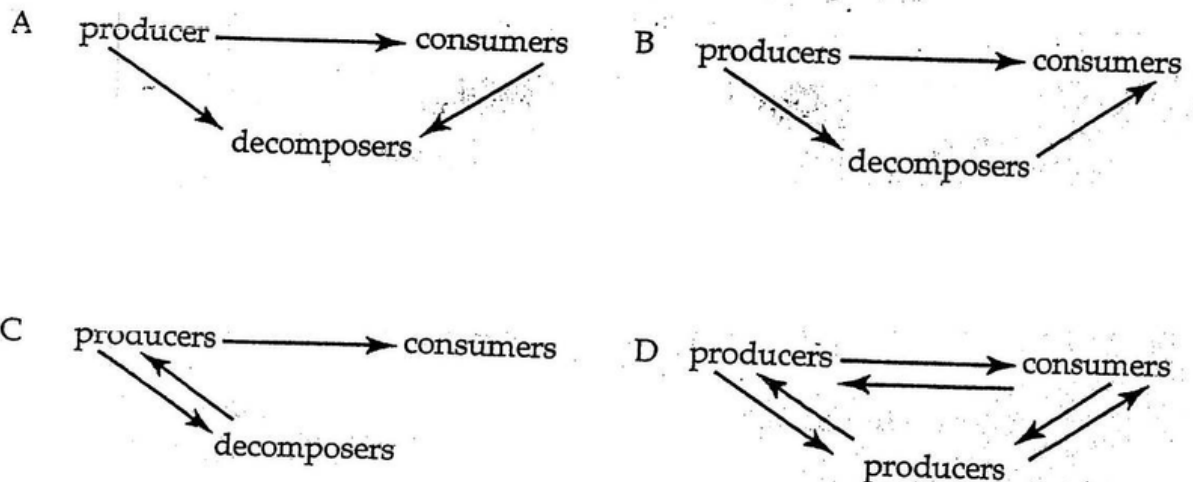
46. This apparatus is used to detect the presence of water and carbon dioxide in air.



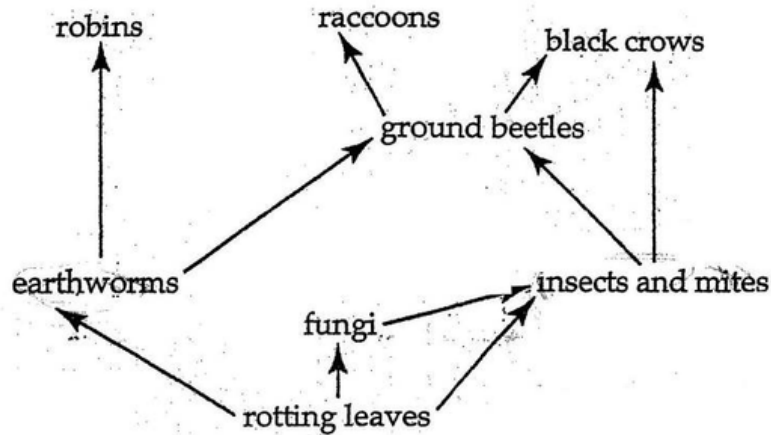
What results would be expected?

Results		
	X	Y
A	blue	clear
B	blue	cloudy
C	white	clear
D	white	cloudy

47. Which diagram shows the flow of energy in an ecosystem?

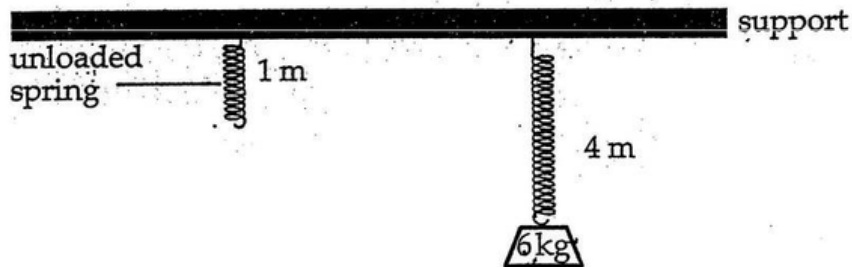


48. The diagram shows a food web.



What will happen to this food web if the earthworms, insects and mites are removed?

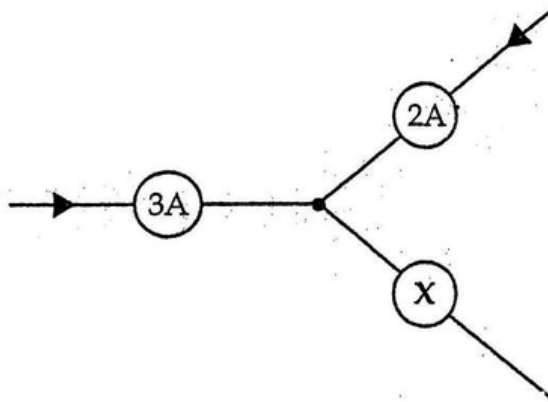
- A Population of black crows will increase.
 - B Population of fungi will increase.
 - C Population of raccoons will increase.
 - D Population of robins will increase.
49. The diagram below shows an unloaded spring hanging from a support and an identical spring loaded with a 6 kg mass.



What will be the length of the spring when it is loaded with a 2 kg mass?

- A 2 m
- B 3 m
- C 4 m
- D 5 m

50. The diagram shows the junction of three wires.



What is the amount of current and its direction as it flows through X?

- A 1 A, toward the junction
- B 1 A, away from the junction
- C 5 A, toward the junction
- D 5 A, away from the junction

School Number	Candidate Number
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COMBINED SCIENCE

PAPER 2 3102/2

Wednesday **28 MAY 2003** 1.50 – 3.20 P.M.

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INSTRUCTIONS TO 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 at the top right hand corner of this page.

Answer **ALL** questions on this paper.

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

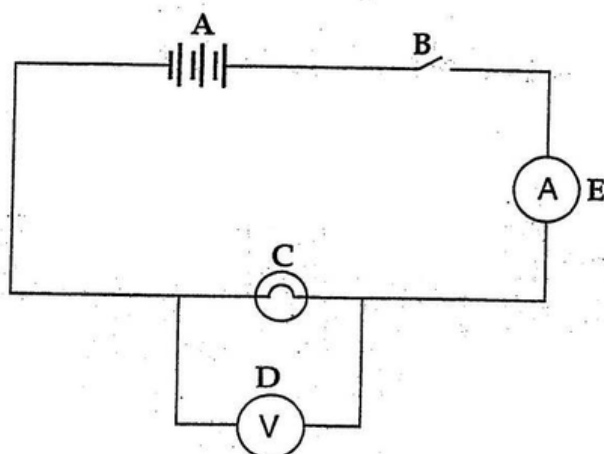
Write your answers in the spaces provided on the question paper. Confine your answer to the lines following each question.

The mark for each part-question is given in brackets [].

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.

1. The diagram shows an electrical circuit.



Name the components labelled A, B, C, D and E and give a function of each in the circuit.

Component	Function
A _____	_____ [2]
B _____	_____ [2]
C _____	_____ [2]
D _____	_____ [2]
E _____	_____ [2]

Total marks [10]

2. Water is a common substance that is essential to life. There are two kinds of water, hard water and soft water.

(a) Define the term **hard water**.

_____ [2]

(b) Describe how you would test a liquid to show that it is water.

_____ [1]

(c) Describe **ONE** effect of soap on hard water.

_____ [1]

(d) Explain briefly why water is called the Universal Solvent.

_____ [1]

(e) Here is a list of substances that may get into a natural water supply.

- A – crude oil
- B – detergents
- C – pesticides
- D – treated sewage

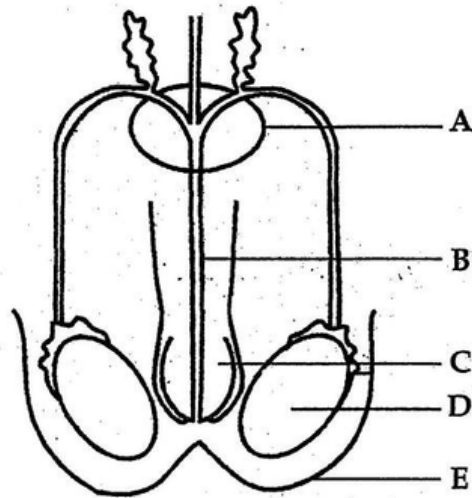
from the list choose the letter of the substance that

- (i) may cause river water to foam; _____
- (ii) cause problems for birds and beaches; _____
- (iii) may build up in the bodies of some birds; _____
- (iv) would not pollute river water. _____

[4]

Total marks [9]

3. The diagram shows a human reproductive system.



- (a) Name the parts labelled A, B, D and E.

A _____

B _____

D _____

E _____ [4]

- (b) Name the gamete produced and state the site where it is produced.

name of gamete _____

site of production _____ [2]

- (c) Name the main hormone produced by a male at puberty and state where it is produced.

hormone _____

produced _____ [2]

- (d) Name a common problem associated with structure A after the age of 40.

_____ [1]

- (e) Name the substance which fills the soft tissue of structure C resulting in an erection.

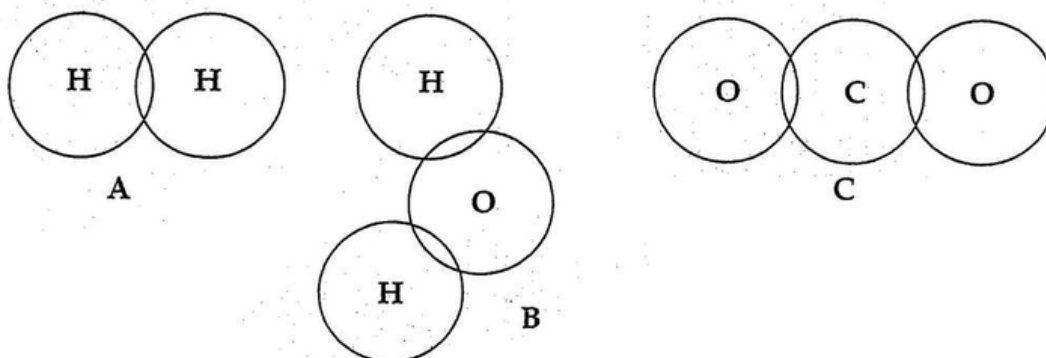
[1]

Total marks [10]

4. The diagram shows three molecules A, B and C.

The circles show the outer orbitals of the atoms which make up these three molecules.

- (a) Complete the diagrams to show the arrangement of the electrons in these orbitals. Use the dot and cross method. [3]



- (b) (i) Name the type of bonding shown in these molecules.

_____ [1]

- (ii) All the atoms in the molecules are stable.

Define the term **stable**.

_____ [2]

- (c) Select from A, B or C to complete the table.

Each letter may be used once, more than once or not at all.

characteristic	molecule
Exists as a liquid at room temperature	
Is an element	
Has the formula H_2O	
Is denser than air	

[4]

Total marks [10]

5. Excretion is a characteristic of **ALL** living things.

(a) Define excretion.

_____ [2]

(b) The table below shows the main excretory organs, their waste products and the process by which each is produced.

Complete the table.

organ	waste products	process
		respiration
liver		detoxification
	urine	
skin	urea, salt, water	

[5]

- (c) The table below shows average amounts of sweat and urine loss in 3 days. (Assume that food and drinks are approximately the same on all 3 days).

conditions	urine loss per day in dm^3	sweat loss per day in dm^3
day 1 normal	1.5	0.5
day 2	2.0	0.0
day 3	0.36	2.0

- (i) On which day was the temperature hottest?

Give one reason for your choice.

day _____

reason _____ [2]

- (ii) Suggest the colour of the urine on day 2.

Give one reason for your answer.

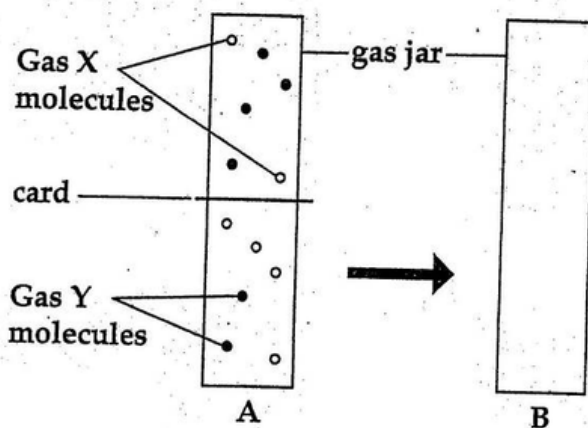
colour _____

reason _____ [2]

Total marks [11]

6. The question below is about the behaviour of gas particles.

- (a) Complete B in the diagram to show how gas Y molecules would appear five minutes after the card was removed. [1]



- (b) Name the process occurring in the diagram above.

_____ [1]

- (c) Gas Y has a brown colour, Gas X is colourless.

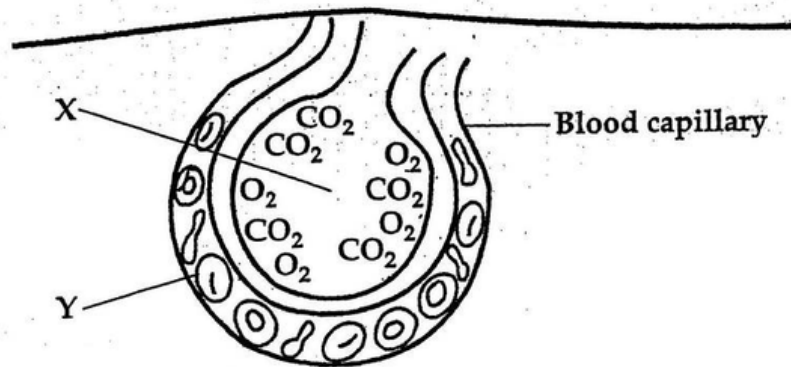
State a visible change which will be seen when A is compared to B.

_____ [1]

- (d) Give an everyday example of this process.

_____ [1]

- (e) The process shown in the diagram also takes place in the lungs. The diagram represents a region of the lungs.



- (i) On the diagram use a broken line to show the direction of the movement of O_2 (oxygen) and a solid line to show the direction of the movement of CO_2 (carbon dioxide). [2]

- (ii) Name the structure labelled X.

_____ [1]

- (iii) Name structure Y and say why it is important.

name _____

importance _____

_____ [2]

- (iv) State why the rate of flow of CO_2 is slower than O_2 .

_____ [1]

Total marks [10]

7. A piece of metal with a mass of 125 g has a density of 5.0 g/cm^3 .

A piece of wood has a mass of 50 g.

Both the piece of metal and the piece of wood are tied together and totally submerged in water. It is discovered that together they displace 90 g of water.

The density of water is 1.00 g/cm^3 .

- (a) Define the term density.

[2]

- (b) Determine the following (show all working).

- (i) volume of water displaced;

[2]

- (ii) volume of the piece of metal;

[2]

- (iii) volume of the wood;

[2]

- (iv) the density of the wood.

[2]

Total marks [10]

8. The table shows the heart rate of an athlete before, during and after a race.

time (minutes)	0	10	30	50	60	90	100
heart rate (beats per minute)	60	60	62	105	108	70	64

- (a) Complete the graph opposite using the information from the chart. [4]

- (b) What is the heart rate at rest?

_____ [1]

- (c) State the time the athlete stopped running. Give a reason for your answer.

time _____ [1]

reason _____ [1]

- (d) The heart muscles need a supply of blood.

- (i) Name the blood vessel which supplies the heart muscles with blood.

_____ [1]

- (ii) State what will happen to the heart muscle if a branch of this blood vessel became blocked.

_____ [1]

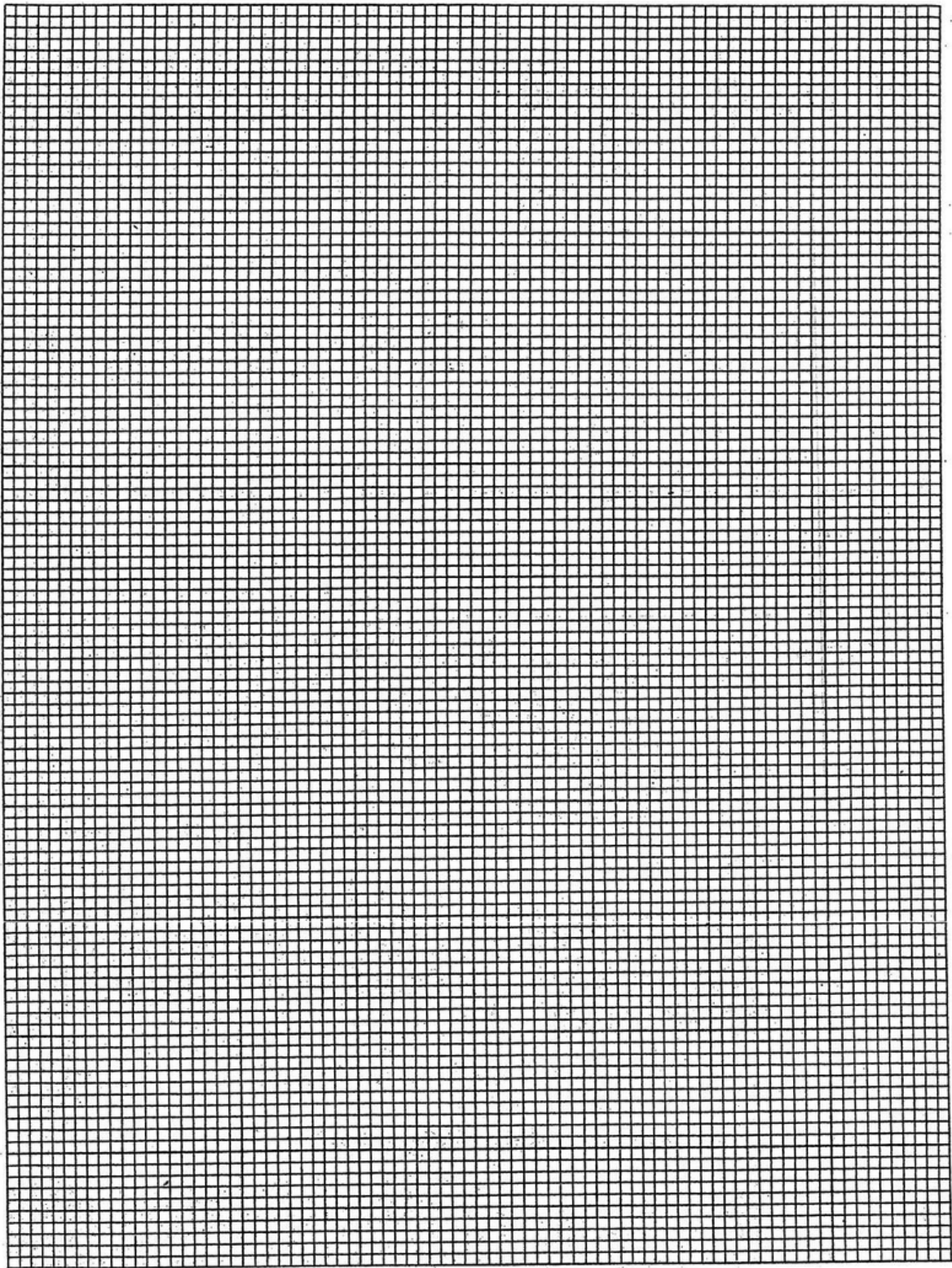
- (iii) State the main cause of blockage of these vessels.

_____ [1]

Total marks [10]

Heart
rate
per
minute

Heart
rate
per
minute



time/minutes

School Number	Candidate Number
Surname and Initials	

COMBINED SCIENCE

PAPER 3

Monday **2 JUNE 2003** 12.30 – 2.00 P.M.

Additional materials:

Answer Booklet for Section B

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 above and on the answer booklet.

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

Answer ANY two (2) out of three (3) questions from Section B in the answer booklet provided which must be attached to the back of the question booklet.

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

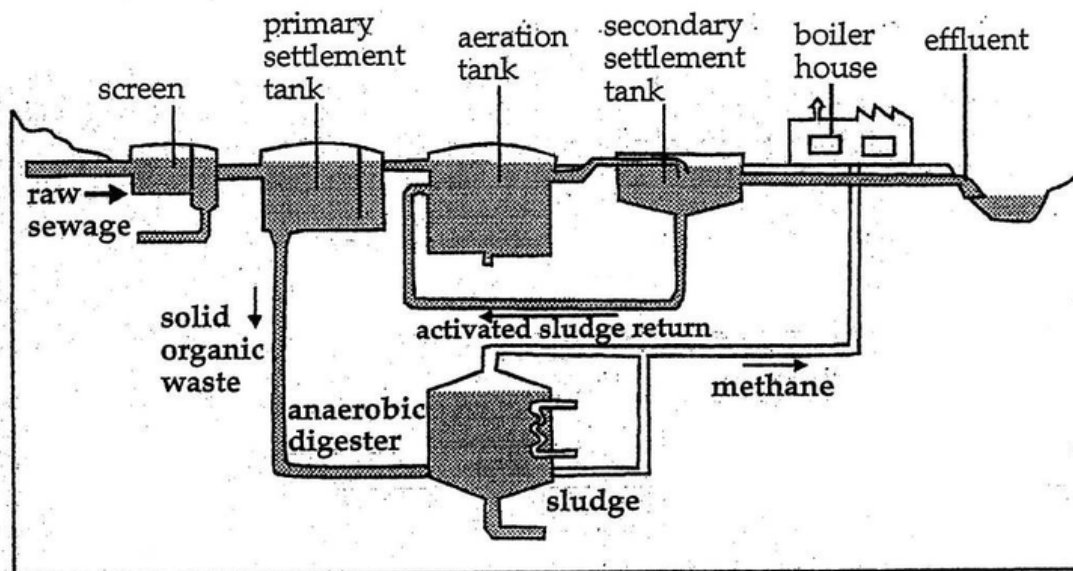
The mark for each part question is given in brackets [].

This question paper consists of 18 printed pages and 2 blank pages.

SECTION A

Answer ALL questions in this section.

1. The diagram shows the activated sludge method of sewage treatment.



- (a) Define the term raw sewage.

_____ [2]

- (b) Explain the function of the screen in this process.

_____ [2]

- (c) Explain what happens in the anaerobic digester.

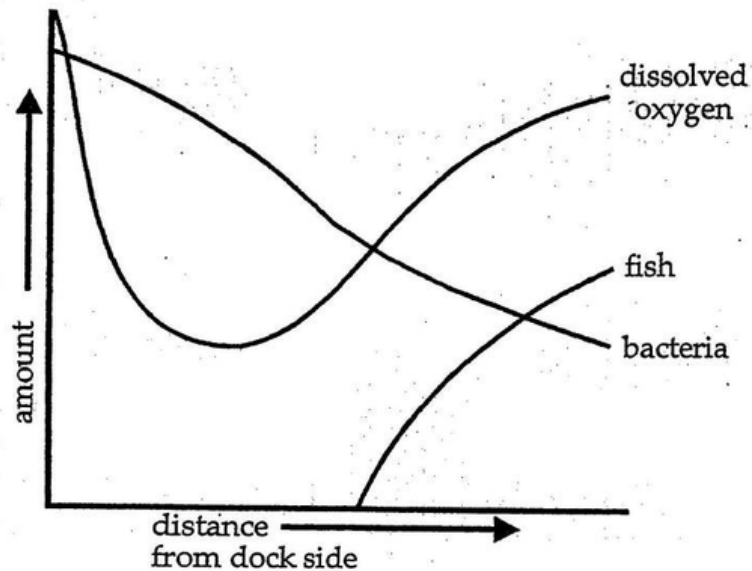
_____ [2]

- (d) Give ONE use of sludge.

_____ [1]

- (e) Investigations suggest that raw sewage is being pumped into Nassau Harbour at Potter's Cay.

The graph below shows the results of a study made on some of the organisms and chemicals in the area.



- (i) Describe and explain the shape of the dissolved oxygen curve.

_____ [2]

- (ii) Use the information in the graphs to suggest which factor controls the number of fish.

factor _____

reason _____

_____ [3]

- (iii) If the sewage being discharged into the harbour had been properly treated before discharge, what differences would you expect to see in the levels of each of the **THREE** factors shown on the curves.

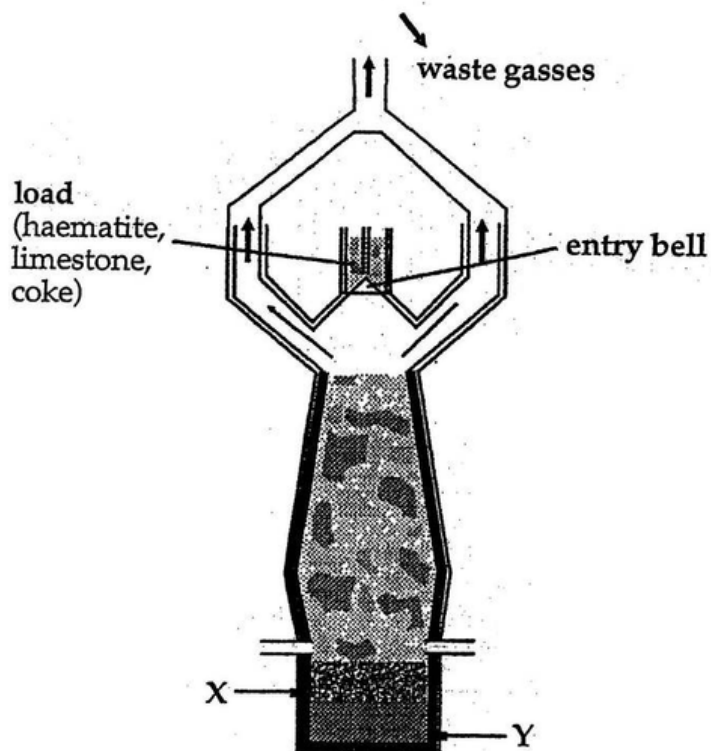
dissolved oxygen _____

fish _____

bacteria _____ [3]

Total marks [15]

2. The diagram shows information about the extraction of a metal from its ore haematite.



- (a) (i) Name the metal being extracted from its ore.

_____ [1]

- (ii) Write the formula for haematite.

_____ [1]

- (iii) State the function of the limestone in this process.

_____ [1]

- (iv) Name the substances drawn off at X and Y.

X _____

Y _____ [2]

- (b) (i) The extraction of a metal depends on the two chemical reactions A and B. Complete the **WORD** equations for these **TWO** reactions by filling in the blank spaces.

Reaction A:

Carbon dioxide + _____ → carbon monoxide

Reaction B:

Carbon monoxide + metal ore → metal + _____ [2]

- (ii) Write down the **balanced formula** equations for reactions A and B.

A _____ [2]

B _____ [2]

- (iii) Find the molecular mass for the product of reaction A.

[1]

- (iv) Name the type of reaction shown in B.

[1]

- (c) The metal produced can be used to manufacture cooking pots.

Give **ONE** advantage and **ONE** disadvantage of using this metal.

Advantage _____

Disadvantage _____

[2]

Total marks [15]

3. The Ministry of Health is encouraging the Bahamian public to consume a balanced diet in an attempt to reduce a number of common diseases.

(a) Define balanced diet.

[2]

- (b) Use the information given on nutritional facts on a breakfast cereal box to answer the questions given.

NUTRITION FACTS		
Serving Size: ½ cup dry (40 g)		
Servings Per Container: 13		
Amount Per Serving	Cereal alone	
Calories	150	
Calories From Fat	25	
		% Daily Value
Total Fat	3 g	5%
Saturated Fat	0.5 g	2%
Polyunsaturated Fat	1 g	
Monounsaturated Fat	1 g	
Cholesterol	0 mg	0%
Sodium	0 mg	0%
Total Carb.	27 g	9%
Soluble Fiber	2 g	
Insoluble Fiber	2 g	
Sugars	1 g	
Protein	5 g	
Vitamin A		2%
Vitamin C		0%
Calcium		0%
Iron		10%

Giving a different reason in each case, suggest why this cereal alone is

- (i) **unsuitable** for the development of healthy teeth and bones;

- (ii) **suitable** for someone with heart disease;

- (iii) **suitable** for a diabetic;

- (iv) **suitable** for someone with high blood pressure.

_____ [4]

- (c) (i) Give the value for the total fibre content of a serving of the cereal.

_____ [1]

- (ii) State why fibre is important in the diet.

_____ [1]

- (d) (i) Name a deficiency disease which could result from this particular cereal being used as a main food source in the diet.

_____ [1]

- (ii) State **ONE** symptom of this disease.

_____ [1]

- (e) Goitre is another deficiency disease. State the cause and give **ONE** symptom of this disease.

Cause _____

Symptom _____

_____ [2]

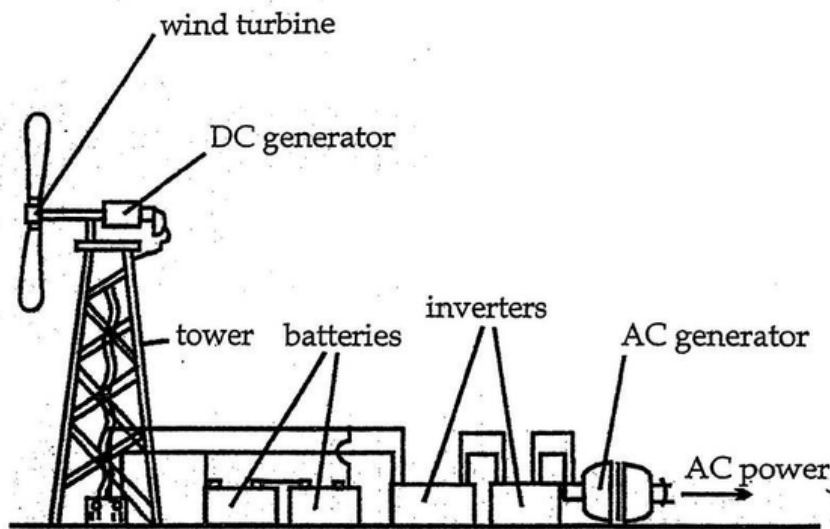
- (f) Kwashiorkor is a common deficiency disease in poor developing countries. It affects infants once they have been weaned from the mother's breast milk.

Explain the reason for this.

[2]

Total marks [15]

4. Today there are many alternative ways being used to generate the energy required for our everyday lives.



The diagram shows a wind turbine in a plant using the wind as an energy source.

- (a) State the energy change which occurs in the turbine.

_____ [1]

- (b) The method shown in the diagram is using a **renewable energy resource** to generate power.

Explain what the phrase **renewable energy resource** means.

_____ [2]

- (c) The chart below gives some information concerning the power output a single turbine can generate.

Wind Speed km/h	Power output for single turbine/kW
3.6	6
7.2	25
11.0	85
14.5	200
18.0	390

An average wind farm contains about 100 turbines.

- (i) Calculate energy output for the farm if wind speed is 18 km/h.

[2]

- (ii) Calculate the fall in energy output of the farm if wind speed dropped to 7.2 km/h.

[3]

- (iii) If the power output of the farm on a given day is 2,200 kW, find the power output of a single turbine for that day.

[2]

- (d) Give **ONE** advantage and **TWO** disadvantages not already mentioned in the question, for this method of power generation.

Advantage _____ [1]

Disadvantage 1 _____

Disadvantage 2 _____ [2]

- (e) Suggest a renewable method for generating power in The Bahamas, giving a reason for your method.

Method _____ [1]

Reason _____ [1]

Total marks [15]

SECTION B

Answer any TWO questions

5. Ecology is the study of the relationship between living things and their environment. The coral reef is a very important ecosystem in The Bahamas.

(a) Define the following terms

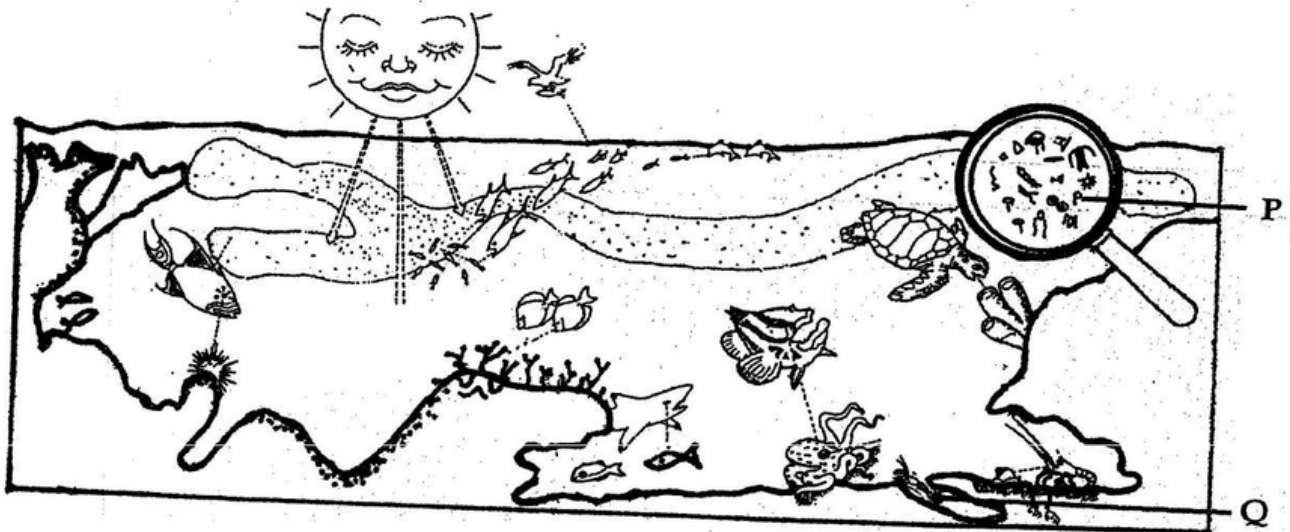
(i) Environment

[2]

(ii) Ecosystem

[2]

(b) The diagram below shows organisms found on a coral reef.



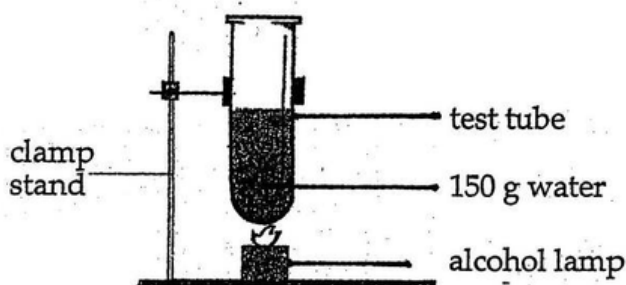
- (i) Using the diagram suggest a food source for the octopus and the turtle and describe their adaptation for feeding on this food source. [4]
- (ii) Give the feeding level of organism P in the food chain and state its function. [2]
- (iii) Describe the mutual relationship which exists between organism P and the grouper. [2]
- (iv) Give **THREE** conditions necessary for the formation of a coral reef. [3]

- (c) (i) State **THREE** benefits of the reef ecosystem to the Bahamian society. [3]
- (ii) Identify **TWO** destructive forces experienced on the coral reef, **ONE** caused by nature and **ONE** caused by man. [2]

Total marks [20]

6. The following diagram illustrates the apparatus used to measure heat energy produced from the combustion of a named fuel.

The chart of the data shows some measurements made by a student during an investigation.



Measurement	Before heating with alcohol	After heating with alcohol
Water temperature	19 °C	34 °C
Mass of alcohol lamp	21.84 g	20.94 g

- (a) Give ONE piece of evidence which supports the statement that combustion is an example of an exothermic reaction. [1]
- (b) Explain fully the relationship between bond making and bond breaking in an exothermic reaction. [4]
- (c)
 - (i) The formula for ethanol is C_2H_5OH . Write the balanced formula equation for the complete combustion of ethanol. [3]
 - (ii) Given that 1 g of ethanol releases 29.7 kJ of energy during combustion. Calculate how much energy was released during this experiment. [3]
 - (iii) State ONE way in which this experiment could be improved. [1]

- (d) A fossil fuel used in The Bahamas is propane (C_3H_8).
- (i) Explain the meaning of the term fossil fuel. [3]
 - (ii) State ONE use of propane in The Bahamas. [1]
 - (iii) 44 g of propane can produce 2,219 kJ of energy. Calculate how much 1 g will produce? [3]
- (e) Choose the better fuel, propane or ethanol. Give a reason for your choice. [2]

Total marks [20]

7. The diagram shows different methods of heat transfer.

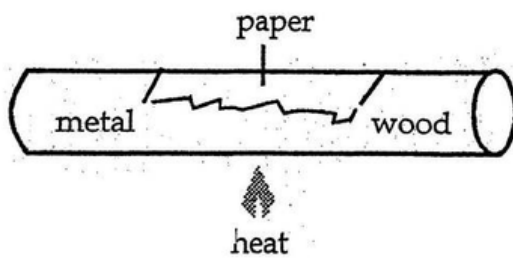


Fig.1

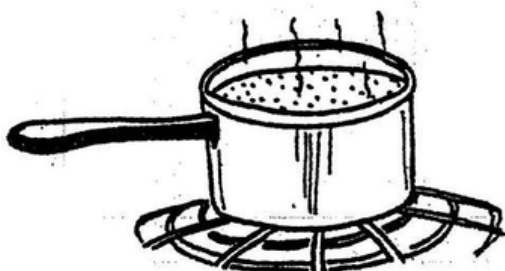


Fig. 2

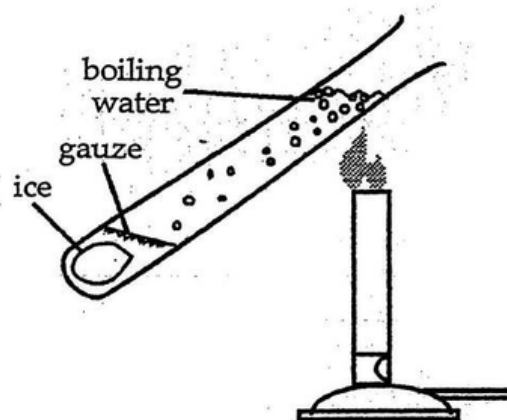


Fig. 3

Fig. 1 shows a piece of paper taped at the top of a metal/wooden rod being heated gently.

- (a) On which side of the rod would the paper first start to burn, give a reason for your answer. [4]
- (b) Fig. 2 shows an aluminium saucepan of water on a hot plate.
- (i) State the method by which heat is transferred **through** the saucepan to the water. [1]
- (ii) Describe how heat is transferred **within** the contents of the saucepan. [3]
- (iii) The Cook felt the heat from the hot plate when the saucepan is removed.

Name the method of heat transfer responsible for the heat felt by the Cook. [1]

- (c) During the experiment shown in Fig. 3, the ice remains solid for several minutes as heating continued.

Explain the reason for this. [3]

- (d) Explain why you should crawl close to the floor in a room filled with smoke during a fire. [2]

- (e) Briefly explain why there is a sea breeze during the day and an offshore breeze at night. You may use a diagram to help explain your answer. [4]

- (f) Allana's recipe called for a preheated oven at a temperature of 150 °C. However, the oven had a Fahrenheit scale.

Calculate the temperature that Allana must set on the Fahrenheit thermometer scale (show all working). [2]

Total marks [20]