

EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

SCIENCE

414/01

Paper 1 Multiple Choice

October/November 2021

1 hour

Additional Materials: Multiple Choice Answer Sheet
Electronic calculator
Soft clean eraser
Soft pencil (type B or HB recommended).

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Write your Centre number, candidate number and name on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in

soft pencil on the separate Answer Sheet.

Read and follow the instructions on the separate Answer Sheet carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough work should be done on this Question Paper and not on the Answer Sheet.

The total of the marks for this paper is 40.

This document consists of **20** printed pages.

1 Which quantity is a scalar?

- A force
- B speed
- C velocity
- D weight

2 What is the principal source of energy in the ecosystem?

- A coal
- B sun
- C water
- D wood

3 Fig. 3.1 shows a light bulb.

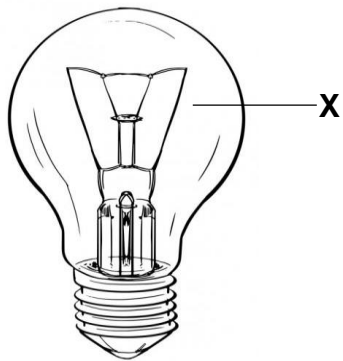


Fig. 3.1

What is the name of the gas labelled **X** in Fig. 3.1?

- A argon
- B chlorine
- C helium
- D oxygen

- 4 Study the list of materials in the box below.

iron nail	copper	rubber	aluminium foil
glass	coin	paper	ice block

What is the total number of electrical conductors in the list?

- A 3
 B 4
 C 5
 D 6
- 5 Fig. 5.1 shows the female reproductive system.

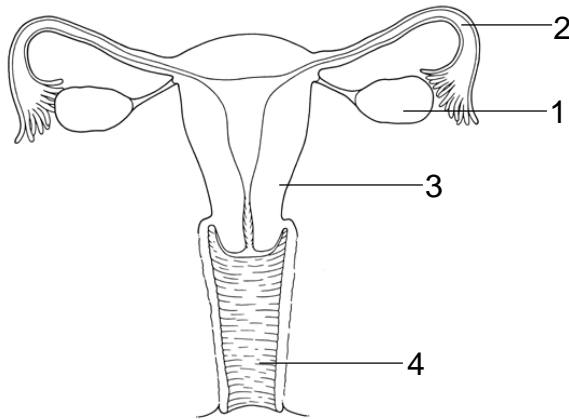


Fig. 5.1

Where do sexual intercourse, fertilisation and pregnancy take place in Fig. 5.1?

	sexual intercourse	fertilisation	pregnancy
A	1	2	3
B	2	3	4
C	4	1	3
D	4	2	3

For **Questions 6** and **7**, refer to Fig. 6.1.

6 Fig. 6.1 shows some elements of the Periodic Table.

	A					
C						

Fig. 6.1

Which letter **A**, **B**, **C** or **D** represents a soft metal?

7 Which element **A**, **B**, **C** or **D** is found in the fourth period of the Periodic Table?

8 The following statements are about velocity.

- 1** Velocity is the displacement per unit time.
- 2** Velocity is the distance travelled per unit time.
- 3** Velocity is the speed attained per unit time
- 4** Velocity is the distance moved in a specified direction per unit time.

Which statement(s) best describe(s) velocity?

- A** 1 only
- B** 2 and 3
- C** 1 and 4
- D** 4 only

9 What is the function of iron in the body?

- A** formation of new cells
- B** formation of haemoglobin
- C** formation of strong bones
- D** formation of red blood cells

- 10 How many different types of atoms are present in a water molecule?
- A 1
 - B 2
 - C 3
 - D 4

For Questions 11 and 12, refer to Fig. 11.1.

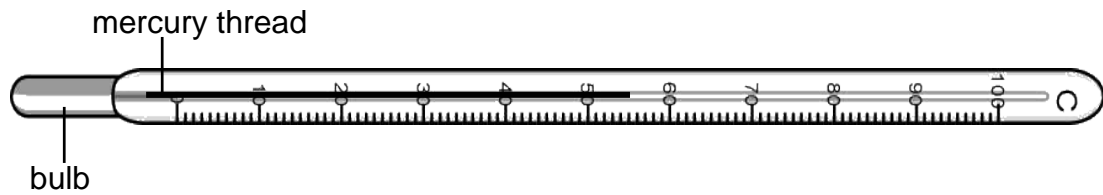


Fig. 11.1

- 11 What is the name of the instrument shown in Fig. 11.1?
- A barometer
 - B thermostat
 - C temperature
 - D thermometer
- 12 What is the reading on the instrument shown in Fig. 11.1?
- A 50.5 °C
 - B 55 °C
 - C 50.45 °C
 - D 50 °C
- 13 A student resembles his father in physical appearance.
Which part of the cell contains material that makes the student resemble his father?
- A vacuole
 - B nucleus
 - C cytoplasm
 - D cell membrane

14 Fig. 14.1 shows a microscope.

A student views a specimen through the microscope but is unable to see the specimen clearly.

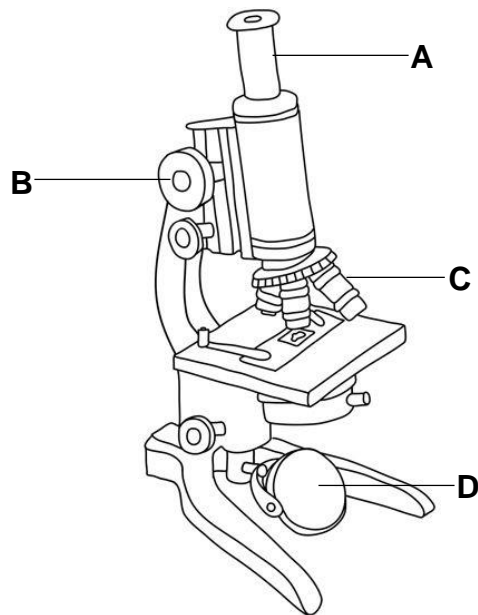


Fig. 14.1

Which part of the microscope **A**, **B**, **C** or **D** should the student adjust in order to see the specimen clearly?

15 Fig. 15.1 shows a parallel beam of light passing through a converging lens.

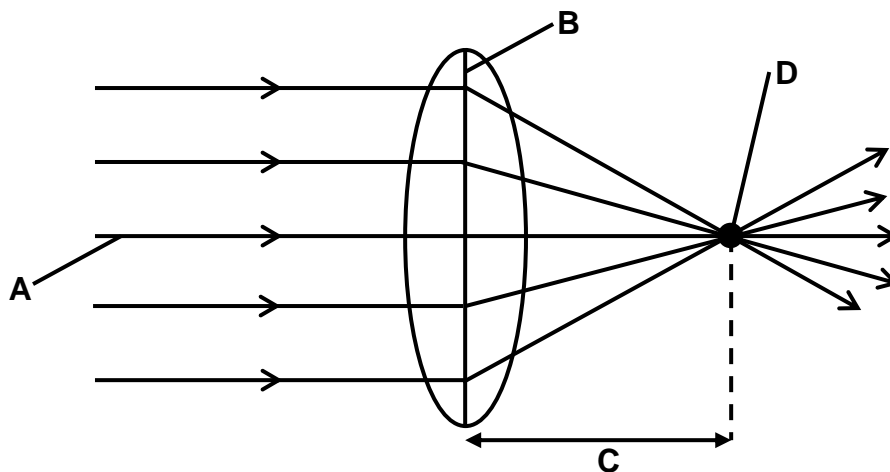


Fig. 15.1

Which letter **A**, **B**, **C** or **D** in Fig. 15.1 represents the principal axis?

- 16 Fig. 16. 1 shows a set-up of apparatus that can be used to prepare and collect carbon dioxide gas in a science laboratory.

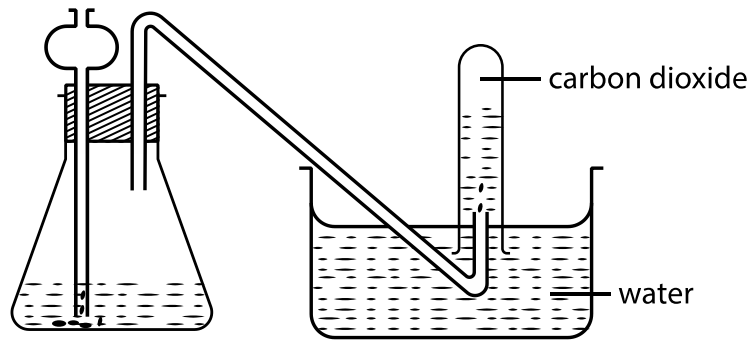


Fig. 16.1

What is the property of carbon dioxide gas that makes it to be collected using the method shown in Fig. 16.1?

- A Carbon dioxide is denser than air.
 - B Carbon dioxide is denser than water.
 - C Carbon dioxide is less dense than air.
 - D Carbon dioxide is less dense than water.
- 17 Which statement is correct about the advantage of friction?
- A it produces sound
 - B it wears off materials
 - C it produces unnecessary heat
 - D it slows down the motion of a moving object

- 18 An investigation about the conditions necessary for photosynthesis was conducted by a Form 4 class.

Fig. 18.1 shows a partly covered green leaf of a de-starched plant the investigation

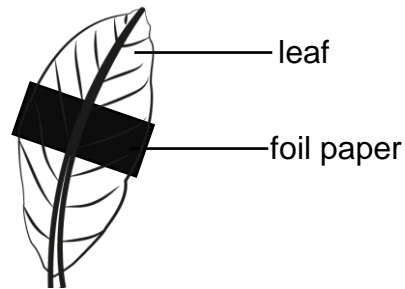
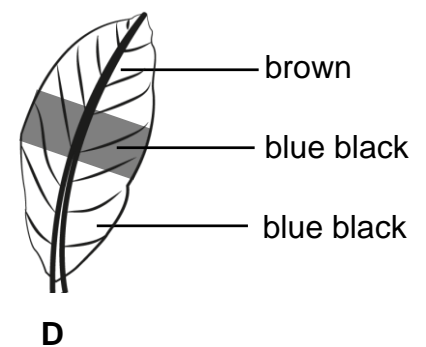
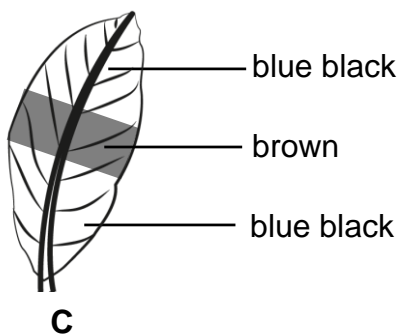
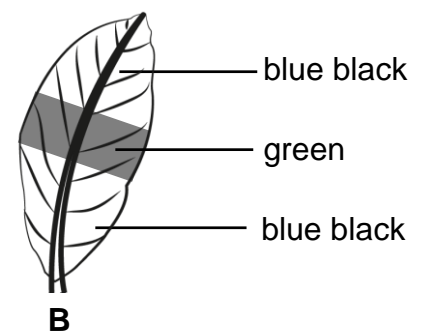
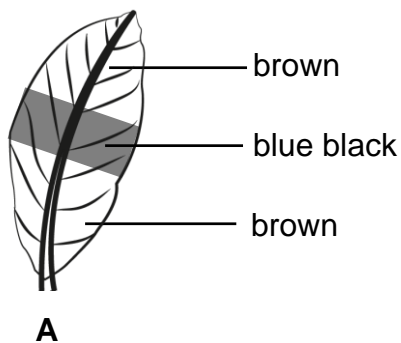


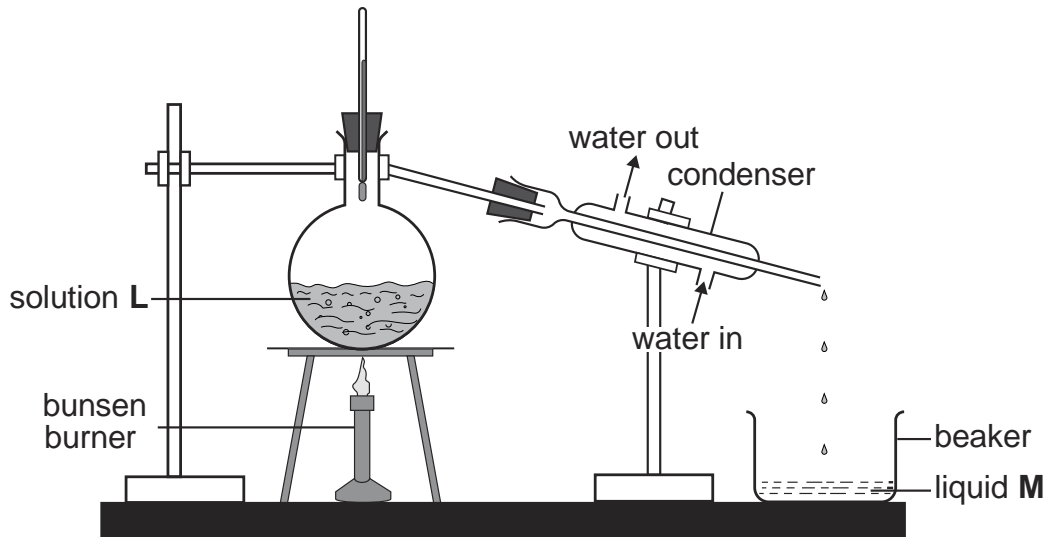
Fig. 18.1

- The plant was then left in sunlight and the leaf was plucked off.
- A test for starch was carried out on the leaf.

Which diagram **A**, **B**, **C** or **D** shows the results of the leaf after the test for starch?



19 Fig. 19.1 shows a set up by a student to carry out simple distillation.



L in Fig. 19.1 is sodium chloride solution.

What is the name of liquid M?

- A water
- B solvent
- C ethanol
- D chlorine

20 Which substances in Table 20.1 are end products of the digestion of carbohydrates and proteins.

Table 20.1

	carbohydrates	protein
A	maltose	amino acids
B	maltose	protein
C	glucose	amino acids
D	glucose	protein

21 Fig. 21.1 shows magnetic field lines between two magnet poles.

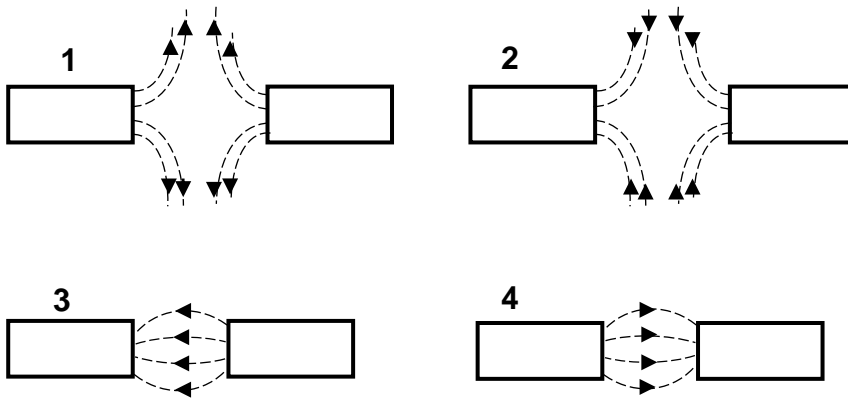


Fig.

Which diagram(s) show(s) two poles repelling each other?

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

22 Fig. 22.1 shows the urinary system.

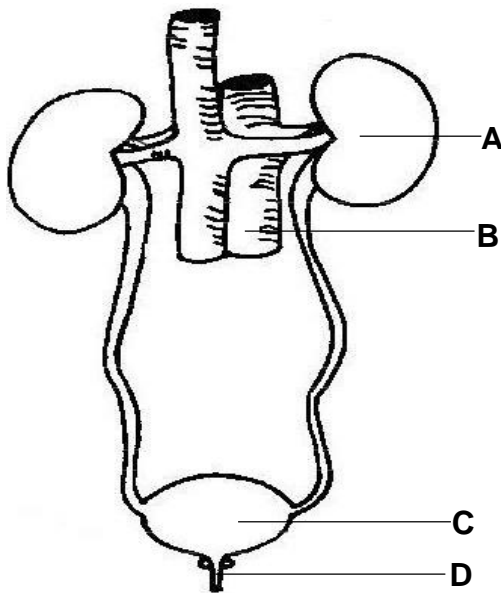


Fig. 22.1

Which structure **A**, **B**, **C** or **D** in the urinary system is damaged if the patient cannot excrete urea from the blood?

23 Why do farmers often add a base to the soil?

- A to kill the stubborn weeds
- B to increase soil fertility
- C to improve soil structure
- D to neutralise acid in the soil

24 Fig. 24.1 shows a man applying a force on a spanner to undo a very tight nut.



Fig. 24.1

What is the moment of the force applied by the man?

- A 15 Nm
- B 50 Nm
- C 150 Nm
- D 166.7 Nm

25 Magnesium burns in oxygen with a bright white flame to form white ash.

The equation for the reaction is:

magnesium + oxygen \longrightarrow white ash

What is the name of the white ash formed?

- A magnesium hydroxide
- B magnesium sulfate
- C magnesium sulfide
- D magnesium oxide

26 Fig. 26.1 shows a man standing in a boat.



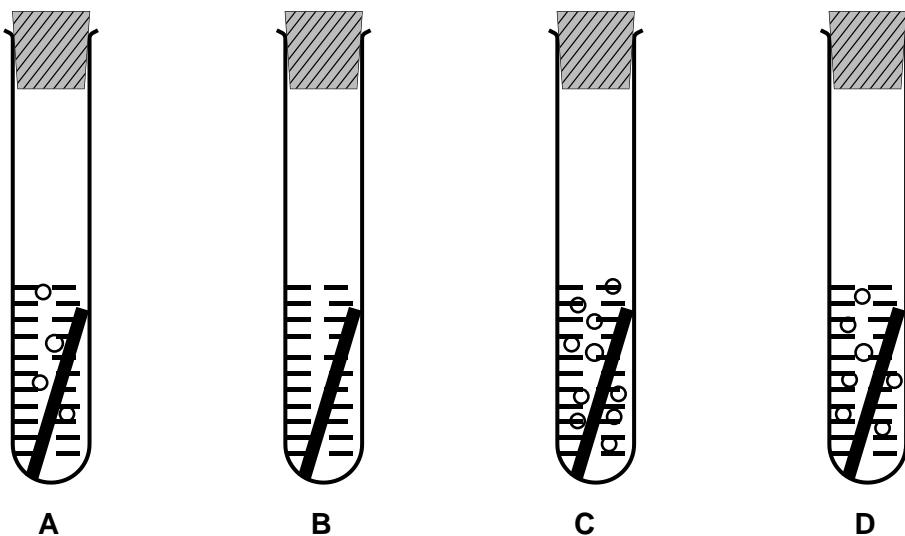
Fig. 26.1

Which statement explains why the boat becomes less stable?

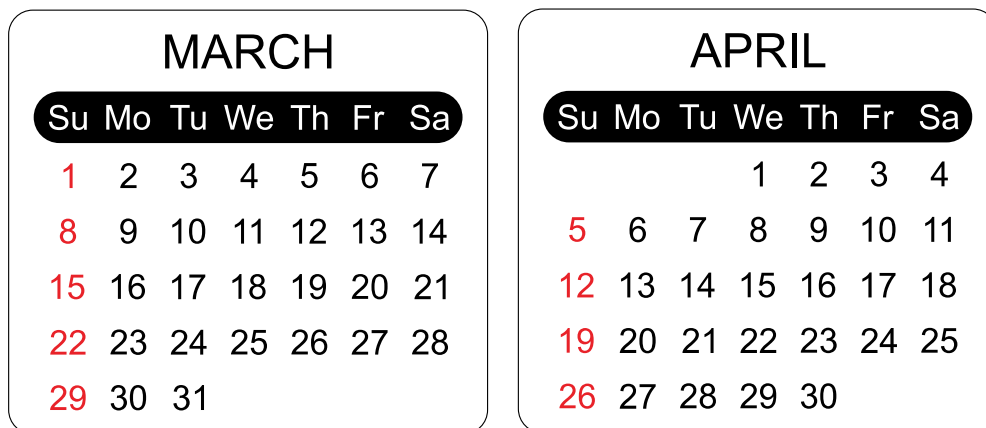
- A The base widens and the centre of mass becomes lower.
- B The base widens and the centre of mass becomes higher.
- C The centre of mass becomes lower and the base remains the same.
- D The centre of mass becomes higher and the base remains the same.

27 Siphso investigates the speed of reaction of four metals by dropping a strip of each metal in a test-tube containing 10 cm^3 of dilute acid as shown in Fig. 27.1.

Which test-tube contains the most reactive metal?



- 28** Fig. 28.1 shows a calendar for the month of March and April.
A girl's menstruation began on the 9th March 2020.



What is the date for her next ovulation?

- A** 22 March
B 31 March
C 5 April
D 18 April
- 29** A student reacts 5 g of calcium carbonate granules with dilute sulfuric acid.
Which statement describes one method she can use to make the reaction faster?
- A** Reacting 10 g calcium carbonate granules with the acid at 25 °C.
B Reacting 5 g calcium carbonate powder with the acid at 25 °C.
C Reacting 5 g calcium carbonate granules with the acid at 15 °C.
D Reacting 20 g calcium carbonate granules with the acid at 10 °C.

- 30** A student wants to calculate the density of a stone of mass 120 g. She measures the volume of the stone as shown in Fig. 30.1.

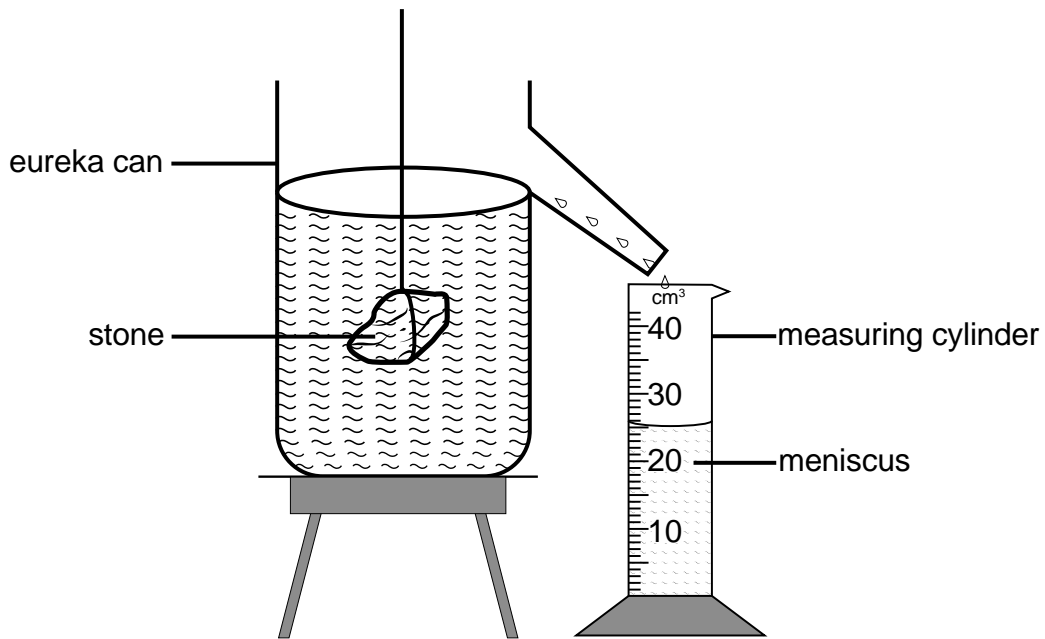


Fig. 30.1

What is the density of the stone?

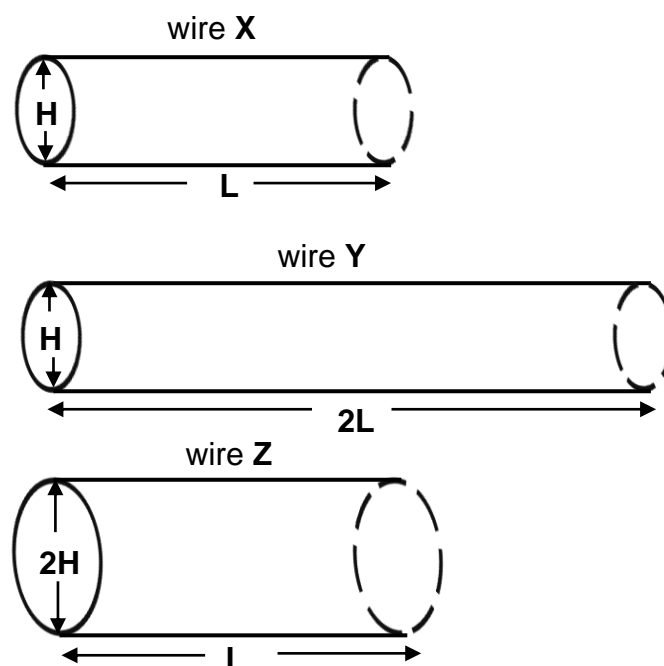
- A** 0.21g/cm³
B 4.8g/cm³
C 120g/cm³
D 3000g/cm³
- 31** A person feels a burning sensation, an abdominal pain and has a pus-like discharge from her vagina as she releases urine.
- Which disease is the person likely to be suffering from?
- A** syphilis
B gonorrhoea
C HIV/AIDS
D tuberculosis

- 32** You are asked to separate crushed sugar cane into juice and fibre.
Which of the following sets of apparatus would be the most suitable?
- A** pestle and mortar, small beaker, filter paper, dropper
B test-tube, conical flask, condenser
C crystallising, filter paper, funnel, Bunsen burner
D filter funnel, filter paper, beaker

Sodium carbonate and potassium hydroxide are bases.

What is the pH range for bases?

- A** 1 to 7
B 8 to 14
C 1 to 6
D 6 to 8
- 33** A car driven by a drunk driver knocked a tree.
Which statement describes an effect of the alcohol on this driver?
- A** no reaction time
B increased heart rate
C increased reaction time
D decreased reaction time
- 34** The diagram shows three wires **X**, **Y** and **Z** of the same material, different lengths (**L**) and different diameters (**H**).



What is the resistance of the three wires **X**, **Y** and **Z**, if wire **X** has a resistance of 5Ω ?

	wire X	wire Y	wire Z
A	5Ω	5Ω	5Ω
B	5Ω	10Ω	10Ω
C	5Ω	10Ω	2.5Ω
D	5Ω	2.5Ω	10Ω

35 A student adds 100 cm^3 of water into a beaker.

She measures the temperature of the water and records it as shown in Table 35.1.

She then adds 4 spatulas full of sodium hydroxide pellets into the water and stirs.

She then measures the temperature of the mixture and records the temperature as shown in Table 35.1.

Table 35.1

Temperature of water before adding pellets / °C	Temperature of water after adding pellets / °C
24	65

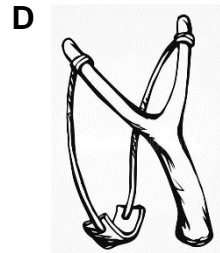
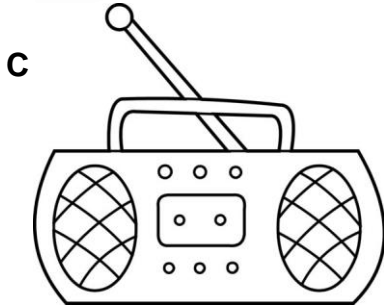
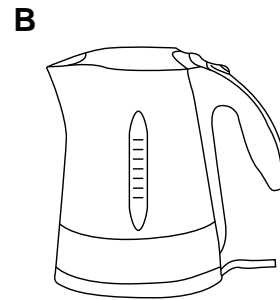
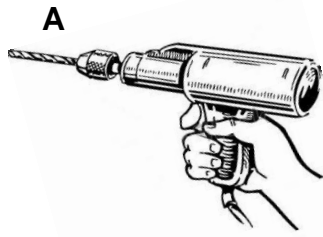
Why is the dissolving of the sodium hydroxide in water exothermic?

- A** a mixture is formed
- B** heat energy is absorbed
- C** a chemical reaction occurs
- D** heat energy is released

36 Which structure of a human heart corresponds correctly to the given function.

	structure	function
A	vein	carry blood to body tissues
B	aorta	prevent backflow of blood from right ventricle into right atrium
C	left atrium	chamber that receives blood from the lungs
D	pulmonary artery	carries oxygenated blood

37 Which device **A**, **B**, **C** or **D** converts electrical energy to kinetic energy?



38 Sugar dissolves in hot tea to form a solution.

Why is this considered as an example of a physical change.

- A** heat is absorbed
- B** a coloured solution is formed
- C** sugar contains some impurities
- D** sugar crystals can be obtained back from the solution

39 Air is a mixture of nitrogen, oxygen, carbon dioxide with traces of noble gases and water vapour.

What is the correct composition of the three main gases in air?

	carbon dioxide %	oxygen %	nitrogen %
A	0.04	21	79
B	1.0	21	78
C	0.03	21	78
D	0.03	21	79

40 What is the function of xylem tissue in plants?

- A** absorbs water from the soil
- B** conducts water up the stem
- C** translocate food through the plant
- D** absorbs mineral salts from the soil

