GR12

G.331

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DAY VOCATIONAL CERTIFICATE EXAMINATION, 1979

SCIENCE (SYLLABUS A)

WEDNESDAY, JUNE 6, 2–4.30 p.m.

INSTRUCTIONS

(a) Answer any **six** questions from this paper.
(b) All questions carry equal marks.

SECTION A—PHYSICS

1. *(a)* What is meant by conduction of heat?

(b) Fig. 1 illustrates an experiment to examine water as a conductor of heat.

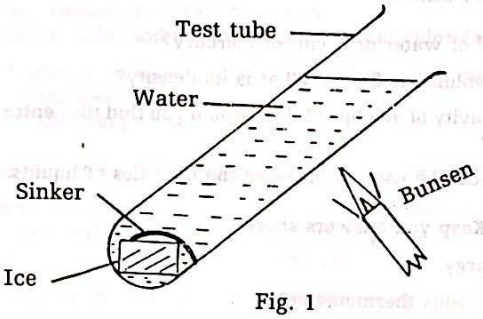
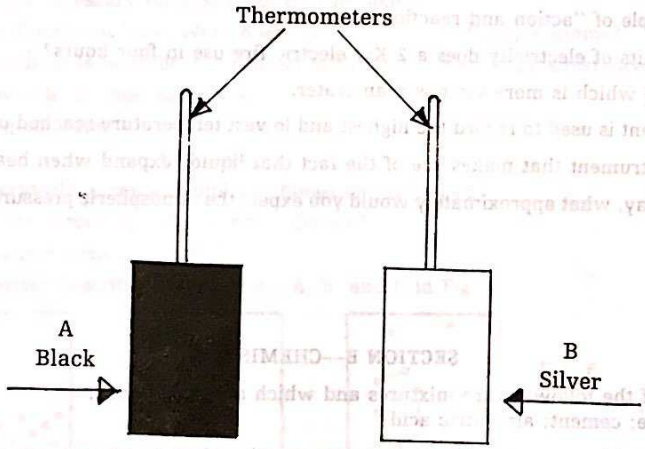


Fig. 1

(i) What happens as the water is heated?
(ii) What conclusions can you draw from the experiment?

(c) Fig. 2 illustrates two identically sized containers each with 200 cm^3 of water at 60°C. A is coated black while B is silver coloured.

Fig. 2



After 5 minutes the temperature of each is noted:
(i) In which container would you expect the temperature to drop faster?
(ii) What does the experiment prove?

(d) Why are dark coloured clothes unsuitable for hot climates?

2. *(a)* What is an electric current?

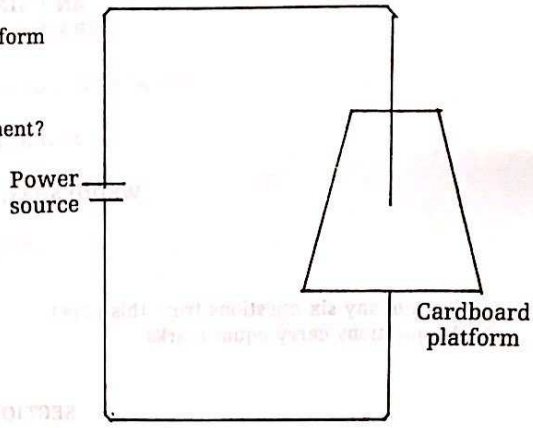
(b) Which of the following will conduct electricity (i) stainless steel; (ii) polythene; (iii) distilled water; (iv) a solution of dilute sulphuric acid?

(c) Some iron filings are shaken on to the cardboard platform shown in Fig. 3. The cardboard is then tapped.

(i) What happens to the filings?

(ii) What conclusions can you draw from the experiment?

Fig. 3



(d) At what voltage is electricity supplied

(i) In a car battery?

(ii) By the E.S.B. in your home or school?

3. *(a)* Which would weigh more, 1 cm^3 of water or 1 cm^3 of mercury?

(b) An object weighs 40 grams. Its volume is 8 cm^3. What is its density?

(c) What is meant by the centre of gravity of an object? How would you find the centre of gravity of a piece of cardboard of irregular shape?

(d) Name a piece of apparatus that can be used to measure the densities of liquids.

4. Answer any *eight* of the following. Keep you answers short.

(a) Name two different forms of energy.

(b) What are the fixed points on a Celsius thermometer?

(c) How would you electrically charge a glass rod?

(d) Give an example of Brownian Movement.

(e) What is meant by convection of heat?

(f) How would you magnetise an iron nail?

(g) Give an example of "action and reaction".

(h) How many units of electricity does a 2 Kw electric fire use in four hours?

(i) Name a liquid which is more viscous than water.

(j) What instrument is used to record the highest and lowest temperature reached over a period of time?

(k) Name any instrument that makes use of the fact that liquids expand when heated.

(l) On a normal day, what approximately would you expect the atmospheric pressure to be? (Use any units you like).

SECTION B—CHEMISTRY

5. *(a)* State which of the following are mixtures and which are compounds:
Carbon dioxide; cement; air; nitric acid.

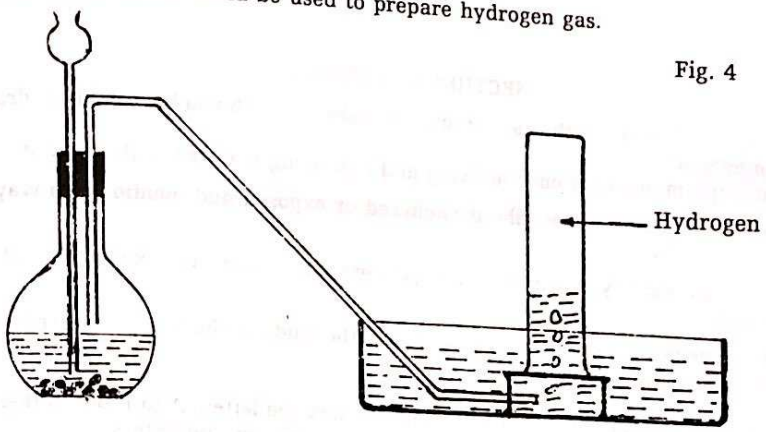
(b) Describe in detail how you would separate pure samples of sand, salt and water from a mixture of all three.

(c) Name two differences between a physical change and a chemical change. Say which of the following are chemical changes.
(i) melting of ice; (ii) rusting of iron; (iii) magnetising a piece of iron; (iv) burning coal.

(d) Name one chemical change that takes place in nature.

6. *(a)* Fig. 4 shows apparatus which could be used to prepare hydrogen gas.

Fig. 4



(i) Name the substances which could be used in the flask to produce hydrogen.

(ii) What test would you carry out to confirm that hydrogen was produced?

(iii) Give any other property of hydrogen.

(iv) Why would it be difficult to collect carbon dioxide or ammonia over water as shown in the above diagram?

(b) Which of the following substances contain hydrogen?
Copper sulphate; sulphuric acid; sodium hydroxide; sodium chloride.

(c) What gas is produced when a mixture of potassium chlorate and manganese dioxide is heated?
How would you collect the gas?
What is the function of the manganese dioxide?

7. *(a)* What is (i) a molecule; (ii) an atom; (iii) the valency of an element?

(b) Draw simple diagrams showing the arrangements of the electrons in the atoms of the following elements. The element's number on the Periodic table is given after each name:
sodium (11); chlorine (17); oxygen (8); magnesium (12).

(c) What is (i) an ionic bond, (ii) a covalent bond? (electro-valent).

(d) What sort of bond would you expect to find (i) between sodium and chlorine in sodium chloride; (ii) between hydrogen and oxygen in water?

8. Answer *eight* of the following items. Keep you answers short.

(a) How is yellow phosphorus stored in the laboratory? Explain your answer.

(b) What two conditions are necessary for rusting of iron to take place?

(c) The atomic number of fluorine is nine. What does this tell us about fluorine atoms?

(d) What happens when sodium is brought into contact with water? Name one substance produced.

(e) Mention one way in which chlorine gas is useful.

(f) Complete the following equation:

$$HCl + NaOH \longrightarrow$$

(g) What happens when crystalline copper sulphate (bluestone) is heated?

(h) What is the approximate percentage of oxygen in the air?

(i) Name two elements which have allotropes?

(j) Name the states of matter described by diagrams A, B, and C in Fig. 5.

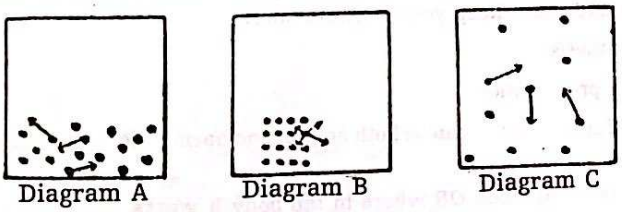


Fig. 5

(k) Name the gas which forms "steamy" white clouds on contact with hydrogen chloride.

(l) What is an inert gas?

SECTION C—BIOLOGY

9. *(a)* Name two types of habitat. In the case of any one habitat which you have studied, draw a diagram to describe the habitat.
Label the diagram, pointing out the living and non-living features of the habitat.

(b) Say whether the habitat you describe is sheltered or exposed and mention two ways in which this affects life in the habitat.

(c) In any habitat you study you will find (i) producers, (ii) consumers. Explain (i) and (ii) and give an example of each.

(d) Name three simple pieces of apparatus you used in the study of the habitat. Describe briefly how you used one of them.

10. *(a)* In the following paragraph, five words are omitted, and the letters A to E put in their place. In your answer book write down the missing words beside the appropriate letters.
"Blood is pumped from the right ventricle to the lungs by way of the pulmonary **A**. It returns from the lungs rich in **B**, and enters the **C** of the heart. From there it passes through a valve into the **D** and then is pumped through the **E** to all parts of the body.

(b) Blood carries the substance B, referred to above to the cells of the body.

(i) What is its function there?

(ii) Name a blood vessel through which blood is brought back from the cells to the heart.

(iii) Name two waste products contained in such blood?

(c) Name any blood vessel in which you would expect to find

(i) blood at high pressure

(ii) blood at low pressure

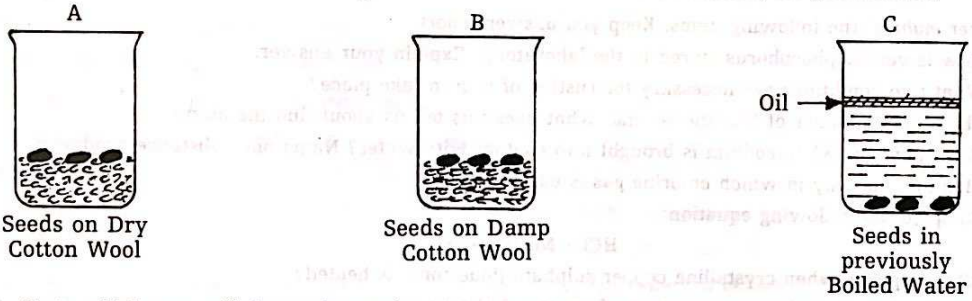
(iii) bright red blood.

11. *(a)* Explain why the dispersal of its seeds is necessary for a plant.

(b) Name *three* natural methods by which seeds are dispersed. Give an example of each.

(c) Name two plants which do not produce seeds. Briefly explain how they reproduce.

(d) Fig. 6 shows illustrations of an experiment to find the conditions necessary for germination.



(i) In which tray will the seeds germinate?

(ii) Explain why germination is unlikely in one of these trays.

12. Answer *eight* of the following questions. Keep your answers short.

(a) What is meant by photosynthesis?

(b) Name two methods of food preservation.

(c) Micro-organisms (bacteria, fungi, viruses) can be both helpful and harmful to mankind. Give an example of each case.

(d) Name one enzyme and state its function *OR* where in the body it works.

(e) What is meant by saying that a poppy is an annual plant?

(f) Give two functions of the leaf of a green plant.

(g) How does oxygen pass from the respiratory system into the bloodstream of the human body?

(h) What is the name given to the cells which carry water and minerals through the stem of a plant?

(i) Give one example of a plant or animal adapting to its environment.

(j) What part do coloured petals play in the life cycle of a flowering plant?

(k) Mention any vitamin and say why the human body needs it.

(l) Name two ways the mouth helps in the breakdown of food.