GR.8

AN ROINN OIDEACHAIS
BRAINSE NA SCRÚDUITHE

DAY VOCATIONAL CERTIFICATE EXAMINATION, 1978

SCIENCE (SYLLABUS A)

WEDNESDAY, JUNE 7, 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)* Which contains the greater amount of heat:– a bathful of water at 50°C or a beakerful of water at the same temperature?

   (b) Why do metal objects normally feel colder to the touch than objects made of wood?

   (c) If you heat a compound bi-metal strip such as that shown in diagram fig.1 over a bunsen burner, say what would happen to the strip and why.

   (d) (i) Which of the following is the normal temperature of the human body: 30°C, 37°C, 100°C.?

   (ii) Which of the following is the boiling point of water: 32°C; 98.4°C; 100°C?

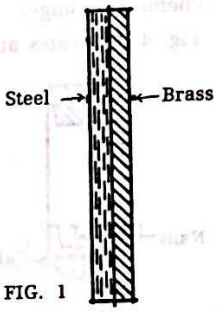


FIG. 1

2. *(a)* What is a force? Give two examples of force from everyday life (other than gravity).

   (b) State the principle of moments.

   (c) Fig. 2 shows a lever in equilibrium. Calculate *X*

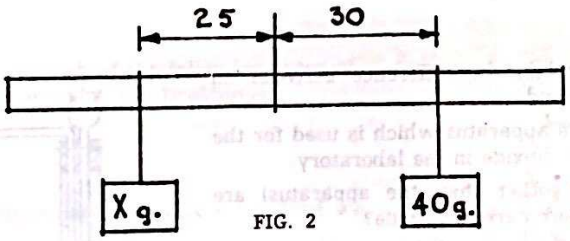


FIG. 2

   (d) Give an example of the conversion of (i) chemical energy to kinetic energy (ii) potential energy to kinetic energy.

   (e) State briefly how you would find the density of a regular shaped block of metal in the laboratory.

3. *(a)* What will happen to a bar magnet if it is suspended horizontally by a piece of thread?

   (b) A sheet of paper covers a bar magnet which rests flat on your desk. Some iron filings are shaken lightly on to the sheet of paper over the magnet. Use a sketch to show what happens to the iron filings and say why.

   (c) Fig. 3 represents an electric circuit.

   (i) Name the instrument A and state its purpose.

   (ii) What happens to the water as the current flows?

   (d) Describe two uses for a magnet.

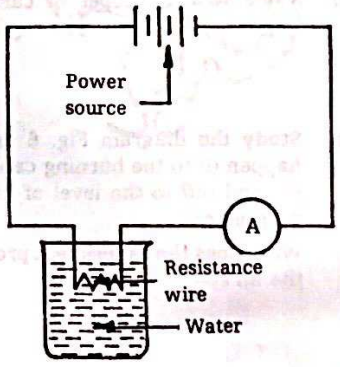


FIG. 3

4. *(a)* If a mass of 4 Kg extends a spiral spring by 10 cm by how much will a mass of 8 Kg extend the same spring?

(b) How many units of electricity will a 2 Kilowatt electric fire use in 6 hours?

(c) It is said that water boils more easily at the top of a high mountain. Do you agree? Give a reason for your answer.

(d) Explain what is meant by conduction of heat.

(e) What is the acceleration of a car which increases its velocity from 10 metres per second to 40 metres per second in 10 seconds?

(f) What is the difference between a neutron and an electron?

(g) How would you show that air has weight?

(h) What happens when the North poles of two bar magnets are brought together?

(i) What are ions?

(j) Say what you would use a hydrometer for.

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

SECTION B—CHEMISTRY

5. *(a)* What change, if any, will take place when the following are exposed to air for 24 hours (i) Sodium metal; (ii) Sodium hydroxide pellets? If a change occurs say whether (i) or (ii) undergoes a physical or a chemical change.

(b) Fig. 4 illustrates an experiment carried out on iron nails in three different test tubes.

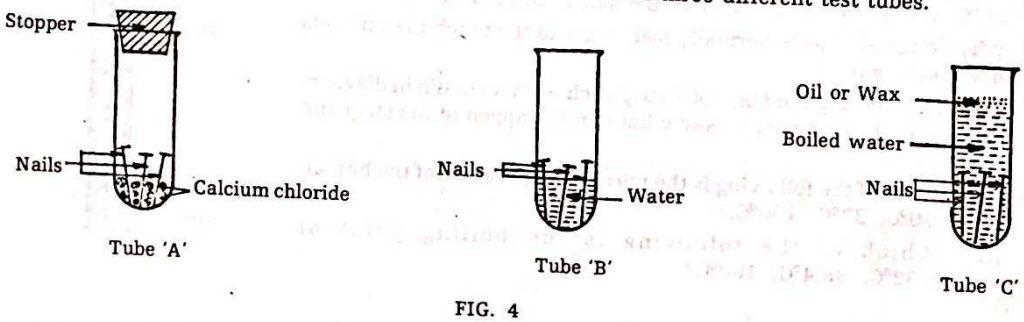


FIG. 4

Describe the condition of the nails in each test tube after the experiment had been allowed to stand for three weeks. Explain your answer.

(c) Name one method of rust prevention.

6. *(a)* Use examples to explain the difference between an element and a compound.

(b) Diagram Fig. 5 shows apparatus which is used for the preparation of carbon dioxide in the laboratory.

(i) What materials (other than the apparatus) are required to prepare carbon dioxide?

(ii) What property of the gas makes it possible to collect it in a beaker as shown?

(iii) What test would you carry out to show that carbon dioxide had been collected in the beaker?

(iv) What use do plants make of carbon dioxide?

(c) Name two allotropes of carbon and two allotropes of sulphur.

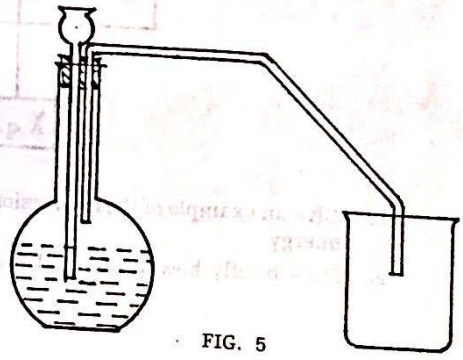
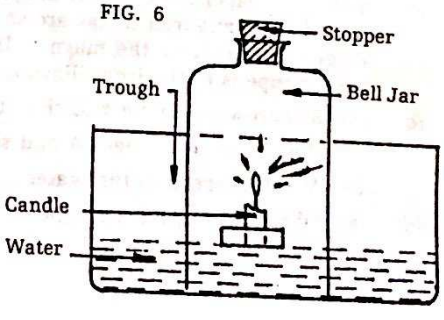


FIG. 5

7. *(a)* Study the diagram Fig. 6 carefully and say what will happen (i) to the burning candle, (ii) to the air in the bell jar and (iii) to the level of the water as the experiment progresses?

What does the experiment prove about the composition of the air?

FIG. 6



(b) Fig. 7 shows the decomposition of water by electrolysis.

(i) Name the gases which are collected in the test tubes A and B as decomposition takes place.

(ii) Which test tube A or B will contain the greater volume and what will be the ratio of their volumes?

(iii) Describe briefly tests you would carry out to identify each of the gases in test tubes A and B.

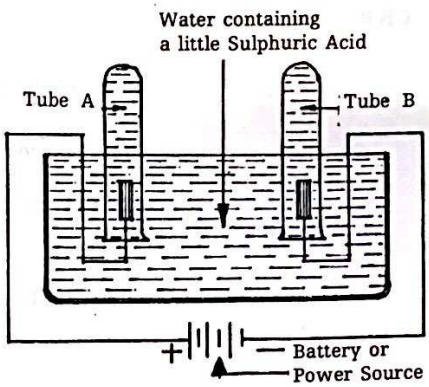


FIG. 7

8. Answer eight of the following items *(a)* to *(k)* . Keep your answers short.

(a) Which of the following are non-metals: helium, sulphur, magnesium, chlorine, calcium, phosphorous?

(b) Name the technique normally used to separate alcohol from water.

(c) Give an example of a chemical change which takes place in nature.

(d) Write the following chemical reaction as an equation using chemical formulae: zinc plus hydrochloric acid ⟶ zinc chloride and hydrogen.

(e) Describe the arrangement of the electrons in the atom of fluorine.

(f) Explain what is meant by the atomic number of an element.

(g) What information is contained in the formula CO_2 for carbon dioxide?

(h) Complete the following equation: $Cu\,SO_4 + 2\,Na\,OH \longrightarrow$

(i) Name two covalent compounds.

(j) State the approximate composition of the air.

(k) Name the elements present in common table salt.

SECTION C—BIOLOGY

9. (a) Describe a habitat which you or your class have visited under the following headings: (i) Wet or dry; (ii) Sheltered or exposed; (iii) Aspect — (facing North, South, East or West); plants which you found there, name four; animals which you found there, name four.

(b) Give an example of a food chain from any habitat you have studied.

(c) Use examples to explain each of the following types of plants: (i) Annual; (ii) Perennial; (iii) Deciduous.

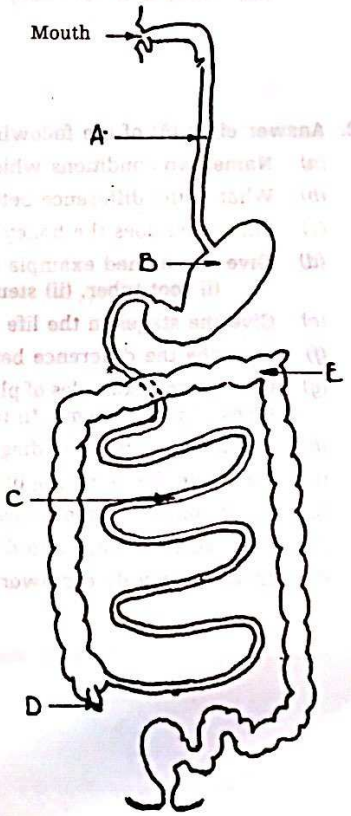


FIG. 9

10. (a) What are the main constituents present in the food we eat?

(b) How would you show simply that a sample of food contains carbon?

(c) Name the parts of the digestive system marked A, B, C, D and E on the diagram Fig. 9.

(d) What is an enzyme? Name one enzyme and describe its function and where in the organism it works.

(e) Outline the functions of the blood in the body.