

**AN ROINN OIDEACHAIS
BRAINSE NA SCRÚDUITHE**

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1976

SCIENCE (SYLLABUS A)

TUESDAY, JUNE 8, 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) A rectangular block of timber 14 cm long, 10 cm wide and 5 cm high weighs 100 grammes.
Calculate (i) the volume of the block,
(ii) the density of the timber.
- (b) Fig. 1 shows Hare's Apparatus. Air is drawn out through tube C and the clip closed.
(i) Describe or sketch the resulting situation.
(ii) What causes this result?
(iii) What measurements would you make and how would you use them to calculate the density of methylated spirit?
- (c) (i) What instrument would you use and what reading would you expect when measuring atmospheric pressure.
(ii) How does this reading vary with altitude?

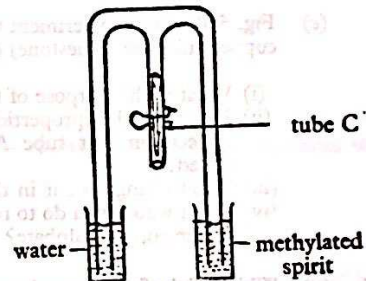


Fig. 1

2. (a) How does the movement of molecules in a gas differ from that in a solid?
- (b) Fig. 2 shows how temperature varies with time as ice is heated.
(i) What happens at A?
(ii) What happens at C?
(iii) At which point has all the ice melted?
(iv) Why does the temperature remain constant between A and B.

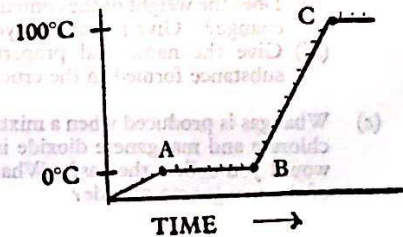


Fig. 2

- (c) Fig. 3 shows the Ingen Hausz apparatus with rods of copper, glass and wood. The ends of the rods are coated with a substance A.

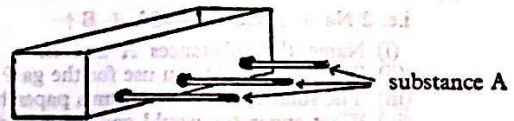


Fig. 3

- (d) Explain how a lagging jacket reduces heat loss from a hot water tank.
3. (a) What is an ion?
(b) How is an electric current conducted in a salt solution?
(c) Fig. 4 shows a coil in which an electric current is flowing.
(i) What happens the compass needle as the current flows.
(ii) What does the experiment show?
(d) How would you use an electric circuit to magnetise an iron bar?

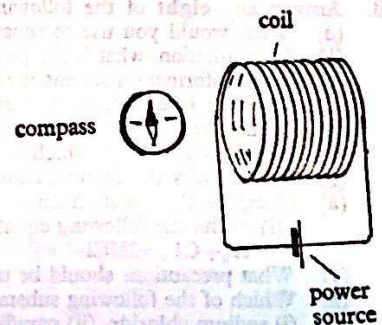


Fig. 4

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

- Name the instrument you would use to measure
 - the outer diameter of a test tube
 - the length of a curved line.
- What energy conversion takes place when the brakes of a car are applied?
- A 5 kg mass cause an extension of 25 cm in a spiral spring. How far would the spring be extended by a mass of 2 kg.?
- Give one practical use for a plumb line.
- How many units of electricity does a 3 kw fire use in 2 hours?
- What is the purpose of a fuse in an electric circuit?
- Give an example of Brownian Movement.
- Name the fixed points on a Celcius thermometer.
- Give an example of "action and reaction".
- Name a liquid which is more viscous than water.
- Explain the purpose of the polished surfaces in a thermosflask.
- How would you electrically charge a glass rod?

SECTION B—CHEMISTRY

- What is sublimation?
 - What apparatus would you use and what would you do to purify a sample of ammonium chloride?
 - Fig. 5 shows an experiment to study the effect of heat on copper sulphate (bluestone) crystals.
 - What is the purpose of the water in the beaker?
 - Describe the properties of the substance which collects in test tube A. What is this substance called?
 - What change occur in the copper sulphate crystals?
 - What would you do to restore the original properties to the copper sulphate?

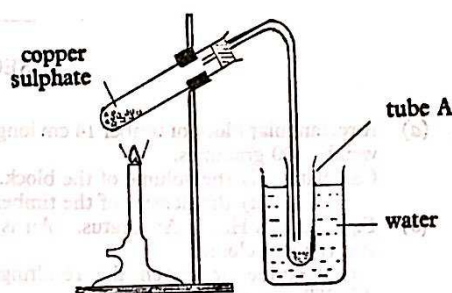


Fig. 5

- Which of the following substances contain oxygen? sodium chloride, water, copper sulphate, carbon.
 - Fig. 6 shows the burning of magnesium ribbon.
 - Why is the crucible left partly uncovered?
 - Does the weight of the contents of the crucible change? Give reasons for your answer.
 - Give the name and properties of the new substance formed in the crucible.
 - 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?

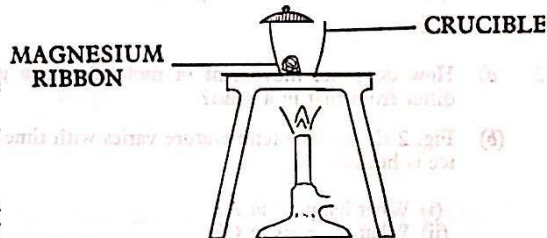


Fig. 6

- What is a chemical change?
 - When sodium metal reacts with water a solution of solid A is formed and a gas B is produced,

$$\text{i.e. } 2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{A} + \text{B} \uparrow$$
 - Name the substances A and B.
 - What test would you use for the gas?
 - The solution turns red litmus paper blue. What does this test show?
 - What apparatus would you use and what would you do to recover a sample of solid A?
 - When marble chips are covered with dilute hydrochloric acid, a gas is evolved.
 - What is the name of this gas?
 - Give **two** properties of the gas.

8. Answer any **eight** of the following. **Keep your answers short.**

- What would you use to separate iron fillings from sawdust?
- In distillation, what is the purpose of the condenser?
- What information is contained in the formula for carbon dioxide (CO₂)?
- Describe **two** differences between a compound and a mixture.
- Name **two** elements which have allotropes.
- Name **two** particles which form the nucleus of an atom.
- Explain why the element neon (atomic number=10) is inert.
- Complete the equation $\text{Zn} + \text{H}_2\text{SO}_4 = \dots + \dots$
 - Write the following equation in words:
 $\text{H}_2 + \text{Cl}_2 = 2\text{HCl}$
- What precautions should be taken when boiling methylated spirit?
- Which of the following substances are covalent?
 - sodium chloride, (ii) paraffin oil, (iii) hydrochloric acid, (iv) water.
- How would you prove that air contains water vapour?

9. (a) Describe a habitat, which you or your class studied (a map or diagram is acceptable). Name four animals and four plants found there. How did you identify them?
- (b) List the pieces of equipment which were used in the study of the habitat. State the purpose for which each piece was used.
- (c) Give an example of a food chain which you discovered in the habitat. Fig. 7 represents a food chain. What will happen to species B if all the plants are killed off? Give reasons for your answer.
10. (a) Explain why the dispersal of its seeds is necessary for the survival of the plant.
- (b) Name four **natural** methods by which seeds are dispersed. Give an example of each.

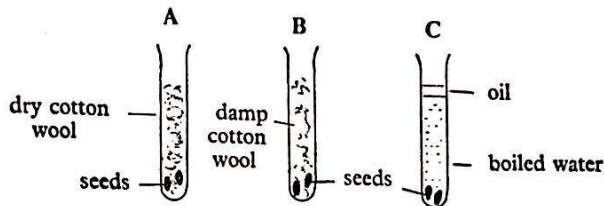
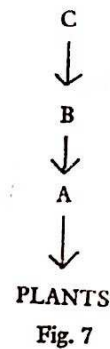


Fig. 8

- (c) Fig. 8 illustrates an experiment to find the conditions under which germination occurs. The seeds were left in water for several hours before the experiment.
- Why were the seeds soaked in water before the experiment?
 - Why was the water in tube C boiled before the experiment?
 - What is the purpose of the oil in tube C?
 - In which test tube will the seeds germinate?
 - What conclusion can be drawn from the experiment?
11. (a) Name two functions of blood.

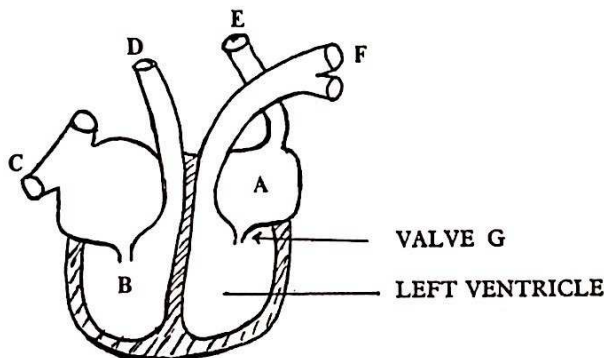


Fig. 9

- (b) Fig. 9 shows the heart and surrounding blood vessels.
- Name the heart chambers A and B.
 - Name the blood vessels C, D, E and F.
- (c) In which of these blood vessels would you expect to find—
- blood at high pressure
 - blood at low pressure
 - bright red blood.
- (d) Give the function of
- The left ventricle
 - The valve G
12. Answer any **eight** of the following. **Keep your answers short.**
- Name the function of the leaf of a green plant.
 - What is the function of root hairs?
 - Give **two** examples of tropisms.
 - What part does pollen play in the life cycle of a plant?
 - Name **one** method of food preservation. What is the principle of the method?
 - How is food broken down in the stomach?
 - Give **one** way in which smoking could affect a person's health.
 - What use does the body make of protein?
 - What is respiration?
 - Give **one** example of adaptation?
 - What is an enzyme?
 - Why do some warm blooded animals hibernate?