

**AN ROINN OIDEACHAIS**  
**INTERMEDIATE CERTIFICATE EXAMINATION, 1989**

**SCIENCE — SYLLABUS E**

TUESDAY, 13 JUNE — MORNING, 9.30 to 12.00

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Answer question 1 and five other questions.  
 All questions carry equal marks.

1. Answer *ten* of the following.

(a) Fig. 1 shows the human leg. Name the bones marked R, S and T.

(b) Which gas is responsible for the *Greenhouse Effect*?

(c) Name the gas X in Fig. 2.

(d) What does a barometer measure?

(e) State *two* functions of blood.

(f) What will happen as air is withdrawn from the bell jar in Fig. 3?

(g) How many atoms are found in a molecule of glucose ( $C_6H_{12}O_6$ )?

(h) Explain why the oil sump plug on a car is usually magnetised.

(i) Name *two* forms of energy.

(j) What gas is produced by the pond weed in Fig. 4?

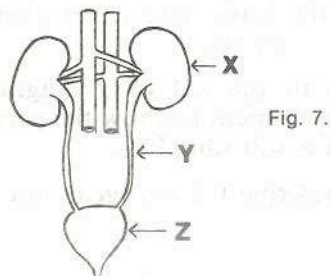
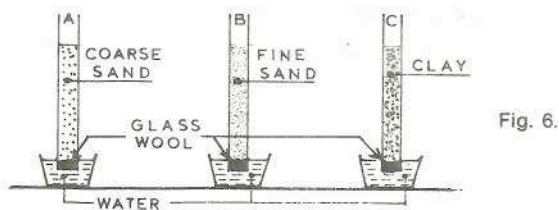
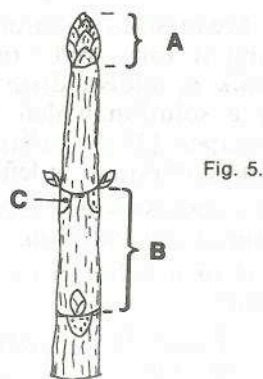
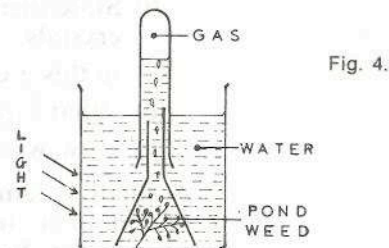
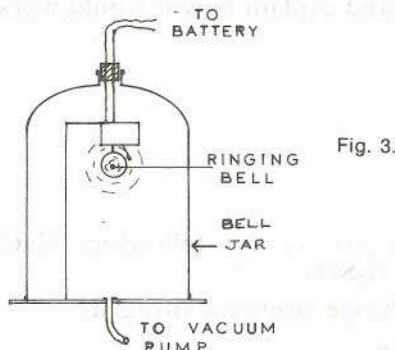
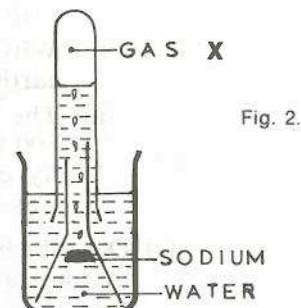
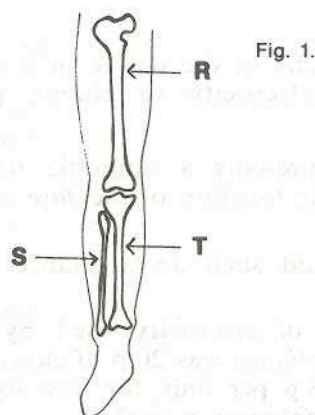
(k) Name the parts of the winter twig in Fig. 5 marked A, B, C.

(l) State a difference between an *electron* and a *proton*.

(m) In which of the tubes in Fig. 6 will the water level be the lowest?

(n) Name the parts marked X, Y, Z in the diagram of the urinary system in Fig. 7.

(o) What is a *catalyst*?



2. (a) Draw a labelled diagram of a simple flower.
- (b) Describe an experiment to show the conditions necessary for germination.
- (c) (i) Name *four* plants that have special adaptations for seed dispersal.
- (ii) In each case, briefly describe these adaptations and how they aid seed dispersal.

3. (a) What is the name of the device in a car which makes electricity to charge the battery?

- (b) (i) Fig. 8 represents a domestic iron. Explain the function of the *fuse* and *switch*.
- (ii) Why should such an appliance be earthed?
- (iii) The cost of electricity used by a 500 W appliance was 20 p. If electricity costs 8 p per unit, for how long was the appliance in use?

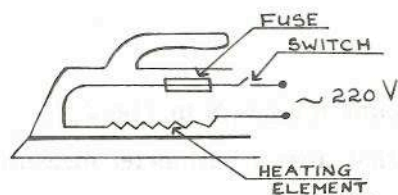


Fig. 8.

- (c) Describe how you would construct a simple thermostat and explain how it would work.

4. (a) (i) Name *two* of the following: NaCl, NH<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>.
- (ii) Which one contains nitrogen?

- (b) Study Fig. 9.

- (i) State one change which occurs in the crystals.
- (ii) Is this a chemical or physical change?
- (iii) What liquid collects in the test tube?
- (iv) How would you identify the liquid?

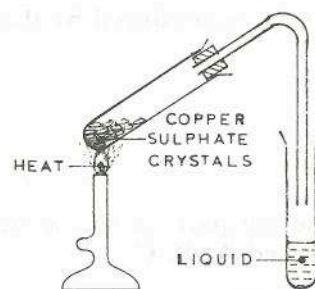


Fig. 9.

- (c) A small volume of bread soda solution is placed in a dish and it turns red litmus paper blue. Sour milk is added, drop by drop, until there is a solution which has no effect on litmus paper. [If the solution is evaporated, a white compound is left.]

- (i) Name the above process which results in the formation of this solution.
- (ii) What is the pH of a solution of the white compound?
- (iii) What process, similar to the above, takes place in the soil?
- (iv) What pH would you expect for rainwater?

5. (a) (i) What chemical elements are found in a fertilizer such as 10 : 10 : 20?
- (ii) Name one other element needed by plants.

- (b) With the aid of a diagram, describe an experiment to show the percentage of water in a soil sample.

- (c) Describe the *nitrogen cycle*.

6. (a) Fig. 10 shows two pots with equal amounts of water.

- (i) In which pot will the water first reach  $80^{\circ}\text{C}$ ?
- (ii) Explain your answer.

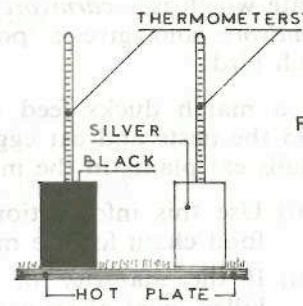


Fig. 10.

- (b) (i) Describe an experiment to show that liquids expand when heated.
- (ii) Sketch the apparatus used.
- (iii) Name an instrument which works on this principle.
- (iv) What precaution is taken, to allow for expansion, in a domestic hot water system?

(c) Fig. 11 shows a hot air balloon.

- (i) Why does hot air make the balloon rise into the air?
- (ii) What does a balloonist do to gain altitude? Explain your answer.
- (iii) How is the balloon made to descend?
- (iv) Comment on the suitability of hydrogen for such a balloon.



Fig. 11.

7. (a) (i) Name *two* foods rich in protein.
- (ii) Why is calcium important in our diet?

- (b) (i) Name the parts of the digestive system labelled A, B, C, D, E, F, G in Fig. 12.
- (ii) Using letters from the sketch state where: (1) food is absorbed, (2) water is absorbed, (3) bile is stored and (4) HCl is found.

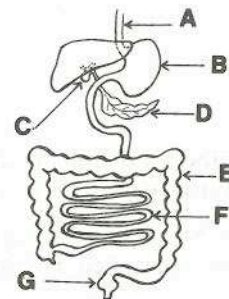


Fig. 12.

- (c) In Fig. 13 all the test tubes were kept at  $37^{\circ}\text{C}$ .
- (i) In which test tube did fermentation take place?
- (ii) Give a reason for your answer.
- (iii) Name two substances formed in fermentation.
- (iv) Give two commercial uses for *yeast*.

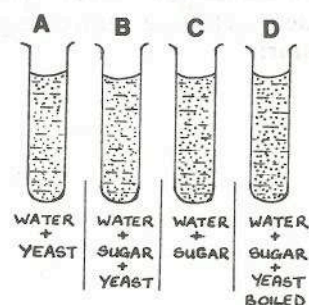


Fig. 13.

8. (a) Examine the sketches A and B in Fig. 14. State which is a *carnivore* and which is an *omnivore* and give a possible name for each bird.
- (b) In a marsh ducks feed on snails. Foxes raid the nests and eat eggs and ducklings. Snails eat plants in the mud.
- Use this information to construct a food chain for the marsh.
  - If the majority of the ducks were killed what affect would this have on the: 1) foxes, 2) snails, 3) plants?

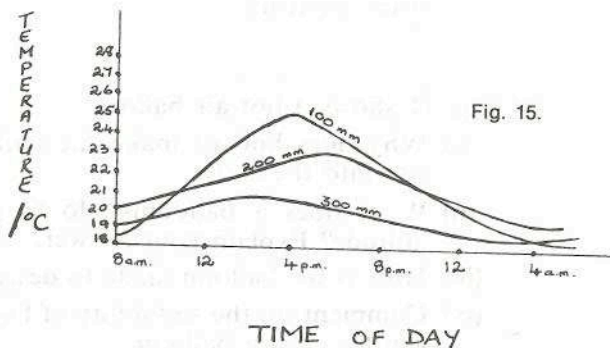


Fig. 14.



- (c) Look at the diagram Fig. 15. The graph shows how temperature varies in soil at different depths during a sunny day in August.

- At what time did the soil at 100 mm reach its highest temperature?
- What was the highest temperature reached by the soil at 200 mm?
- Which side of a hill would you expect to heat the faster?
- What is the effect of soil temperature on plant growth?



9. (a) (i) What is the percentage of oxygen in the air?
- (ii) What component of the blood transports oxygen?
- (b) (i) Briefly describe how you would prepare and collect a sample of oxygen.
- (ii) Draw a diagram of the apparatus you would use.
- (c) (i) Explain why magnesium gains mass on heating.
- (ii) Describe what happens when magnesium is heated. Give the chemical equation and the name and colour of the product.

10. (a) Describe a suitable location for the reservoir supplying water to a town.
- (b) Describe an experiment to find the density of a small irregular object.
- (c) (i) Sketch *Hare's Apparatus*.
- (ii) What measurements would you make and how would you use them to calculate the *specific gravity* (relative density) of a liquid e.g. methylated spirit?