AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1986

SCIENCE—SYLLABUS E

TUESDAY, 17 JUNE—MORNING, 9.30 to 12.00

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

1. Answer *ten* of the following items. (Keep your answers short).

(*a*) What is the pH of a neutral solution?

(*b*) What compounds are represented by the following symbols:
CO_2, HCl, NaOH?

(*c*) Name any *three* of the types of teeth labelled L, M, P & Q in the diagram Fig. 1.

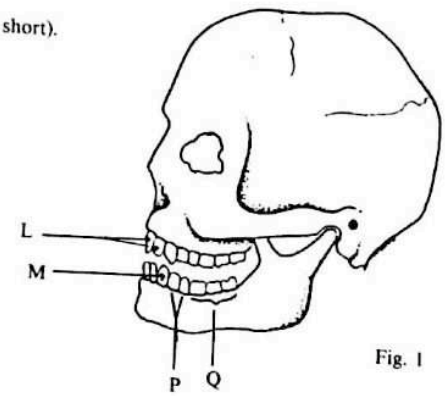

Fig. 1

(*d*) When a piece of blue cobalt chloride paper is exposed to the air it turns a pink colour. What causes this?

(*e*) Name the parts of the ear marked D, E, F, in the diagram Fig. 2.

(*f*) When homozygous red cattle (RR) are crossed with homozygous white cattle (rr), roan cattle are produced. What is the genotype of the F_1 cattle?

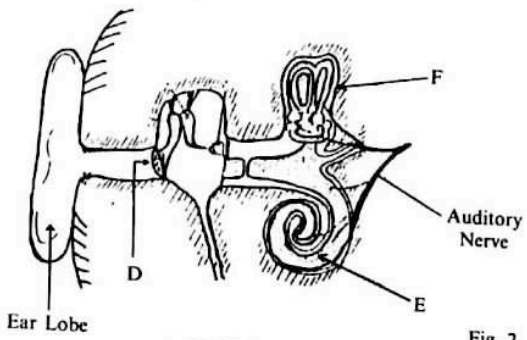

Fig. 2

(*g*) What is the apparatus in the diagram Fig. 3 being used to demonstrate?

(*h*) What organism would you expect to find in the root nodule of a clover plant?

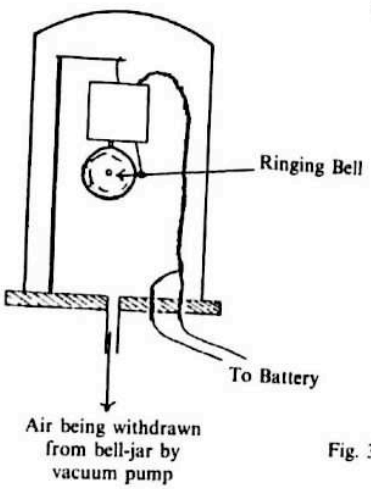

Fig. 3

(*i*) In the diagram Fig. 4, what will happen when air is withdrawn from the bell-jar?

(*j*) For what purpose would you use Fehling's solution in the laboratory?

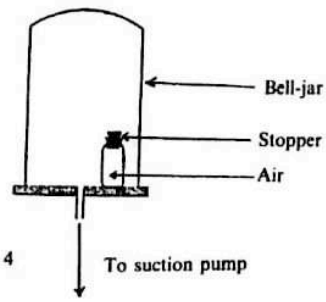

Fig. 4

(*k*) In the diagram of the female reproductive system, Fig. 5, name the parts labelled S and T.

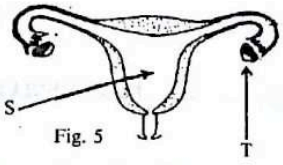

Fig. 5

(*l*) Name *two* terrestrial insects and *one* aquatic insect.

(*m*) The diagram Fig. 6 shows a method of plant propagation in which a shoot A is inserted in a parent B. The joint is tied and covered with wax as in C. What is this method called?

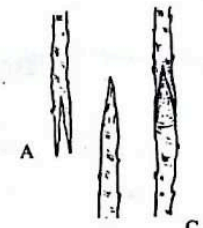

Fig. 6

(*n*) In the diagram Fig. 7, ether is poured on the tissue at Z. Explain what will happen and why.

(*o*) Name the process used to separate two liquids, which have different boiling points.

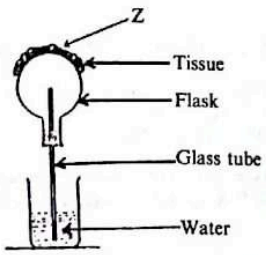

Fig. 7

2. (*a*) Draw a simple labelled diagram of the main external features of a typical flowering plant.

(*b*) In the diagram Fig. 8:–

(i) What process is being demonstrated?

(ii) What is the function of the air bubble?

(iii) What would be the effect of placing an electric fan near the leafy shoot?

(iv) What is hydrotropism?

(*c*) (i) Name *one* plant in each case to illustrate the following:
a tap root, tendrils, a corm, a bulb, a root tuber.

(ii) Describe how each of the following may be vegetatively propagated: blackcurrant, rhubarb, strawberry, dahlia, scutch grass.

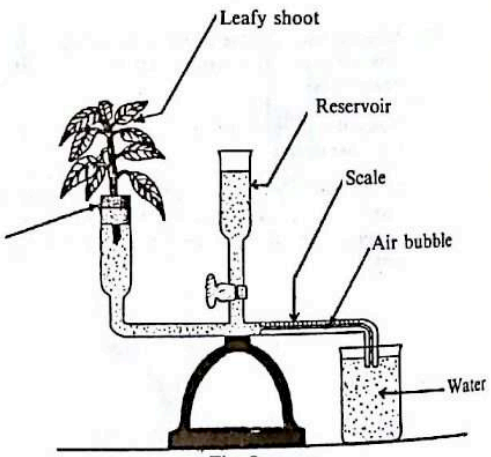

Fig. 8

3. (*a*) (i) What are the upper and lower fixed points on the centigrade scale?

(ii) How are these points obtained?

(*b*) (i) Using a diagram, describe an experiment, to show that some metals are better conductors of heat than others.

(*c*) (i) The diagram Fig. 9 shows a model fire alarm. Explain how it works.

(ii) What would you need to know about a piece of zinc, in order to find out the amount of heat required to raise it to a given temperature?

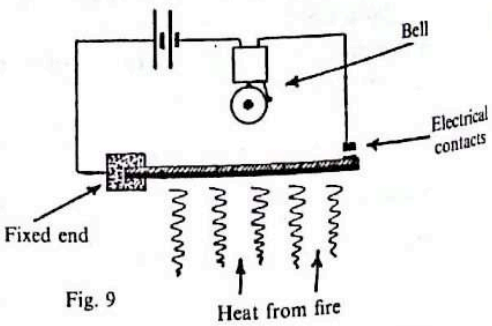

Fig. 9

4. (*a*) (i) If a bar magnet is suspended by a piece of thread from a stand, in what direction will it point when it comes to rest?

(*b*) (i) Using iron filings, a bar magnet and paper, describe how you would show the lines of magnetic force around the bar magnet.

(ii) Draw a diagram of the result.

(*c*) Study the experimental circuit in the diagram Fig. 10.

(i) What does each of the instruments B and C measure?

(ii) Calculate the resistance R if the reading at B is 4 and the reading at C is 12.

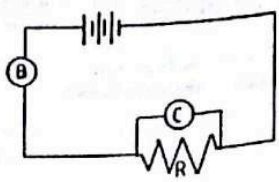

Fig. 10

5. (a) State the location and function of the gall bladder.

(b) Draw a sketch of the human digestive system and carefully label *five* parts.

(c) The diagram Fig. 11 shows an experiment set up to investigate the action of an enzyme. After thirty minutes the contents of each test tube are tested with iodine.

(i) State what will happen in each test tube and why.

(ii) What further test might you perform on the contents of each tube?

(iii) Name one food rich in starch.

(iv) Name one element found in starch.

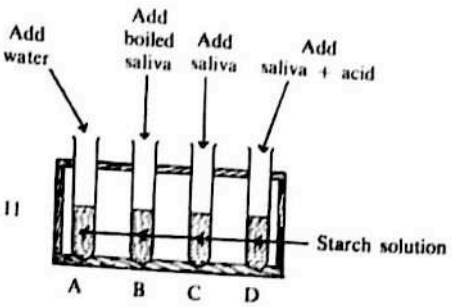

Fig. 11

6. (a) What is humus?

(b) An experiment to show the presence of micro-organisms in the soil is set up as in the diagram Fig. 12.

(i) What will be the result of the experiment? Give a reason for your answer.

(ii) What is sterilized soil?

(iii) What are micro-organisms?

(c) Sulphate of ammonia is a salt which is soluble in water and often used as a garden fertilizer.

(i) What compounds are used in the making of sulphate of ammonia?

(ii) Name one major element for plant growth which is supplied by sulphate of ammonia.

(iii) Name *five other* chemical elements obtained by plants from the soil.

(iv) Explain the term 'salt'.

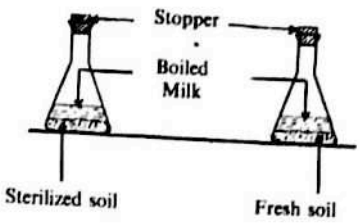

Fig. 12

7. (a) (i) How would you protect iron from rusting?

(ii) Give a reason for your answer.

(b) The diagram Fig. 13 shows an experiment on rusting. As the steel wool rusts, water is drawn up into the test tube.

(i) Explain why this happens.

(ii) What type of change takes place in rusting?

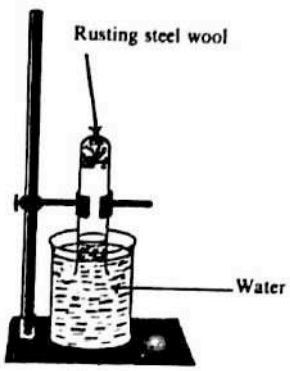

Fig. 13

(c) When magnesium ribbon is burned in the presence of steam, as in the diagram Fig. 14, it burns brightly and changes to a white powder, while at the same time a colourless gas collects at Z.

(i) What is the white powder called?

(ii) Name the colourless gas.

(iii) How would you test this gas?

(iv) Write an equation for the reaction which occurs.

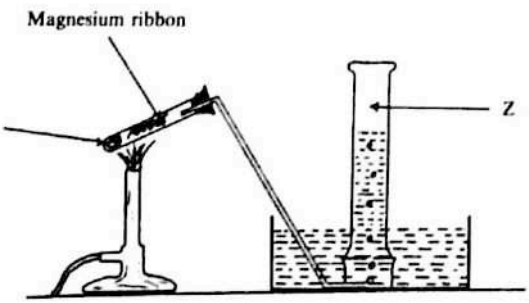

Fig. 14

8. (*a*) (i) What is meant by oxygenated blood?

(ii) Name the blood vessel which brings deoxygenated blood from the heart to the lungs.

(*b*) The apparatus in the diagram Fig. 15 was used in an experiment on respiration. A student breathes in and out through the mouthpiece by releasing and closing the clips A & B.

(i) What is the purpose of the experiment?

(ii) Name the liquid in flask X.

(iii) Through which flask is air drawn in?

(iv) What is the result of this experiment?

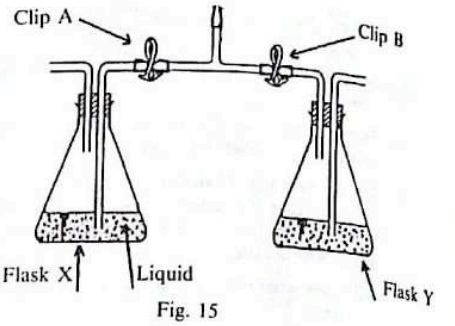

Fig. 15

(*c*) (i) Name any five of the parts labelled L, M, N, P, Q, & R in the diagram Fig. 16.

(ii) Describe the function of the diaphragm in breathing.

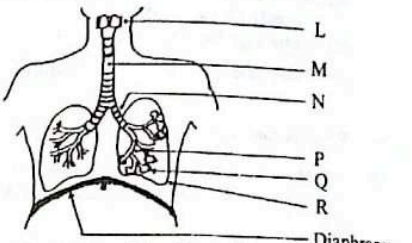

Fig. 16

9. (*a*) (i) What two gases make up the biggest proportion of the air?

(ii) State the usual % of each in air.

(*b*) (i) Briefly describe how you would prepare and collect carbon dioxide.

(ii) Draw a diagram of the apparatus you would use.

(*c*) The graph in the diagram Fig. 17, shows how the percentage of carbon dioxide varied, above the surface of a grass field, at regular intervals, over a twenty four hour period, during calm weather.
Study the graph and explain the result shown.

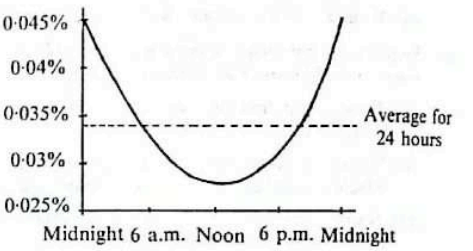

Fig. 17

10. (*a*) (i) What is the use of a hydrometer.

(ii) What reading will it show when placed in a cylinder of water?

(*b*) (i) Briefly describe how you would construct a simple mercury barometer.

(ii) Sketch the barometer.

(*c*) (i) The diagram Fig. 18 shows a uniform metre stick suspended at its mid-point. A small stone, suspended at the 30 cm mark is balanced by a mass of 40 g suspended at the 80 cm mark. Calculate the mass of the stone.

(ii) When lowered into an overflow can, the stone displaces some water as shown in diagram Fig. 19. Calculate the density of the stone.

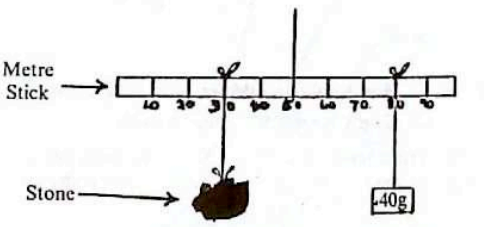

Fig. 18

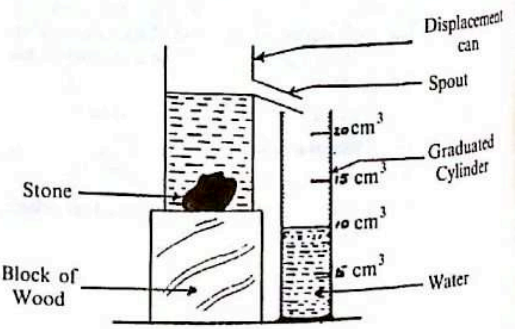

Fig. 19