AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1991

7271

SCIENCE — SYLLABUS E

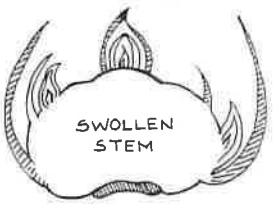
TUESDAY, 11 JUNE — MORNING, 9.30 to 12.00

Answer question 1 and 5 other questions.
All questions carry equal marks.

1. Answer *ten* of the following.

(*a*) Name the plant organ shown in Fig. 1.

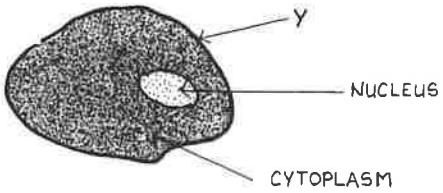
Fig. 1



(*b*) If the mass of a piece of copper is 180 g and its volume is 20 cm^3, what is the density of copper?

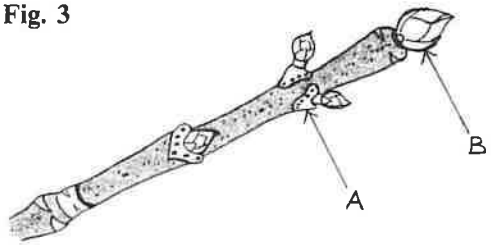
(*c*) Name the part marked **Y** in Fig. 2.

Fig. 2



(*d*) Name the parts **A** and **B** of the winter twig in Fig. 3.

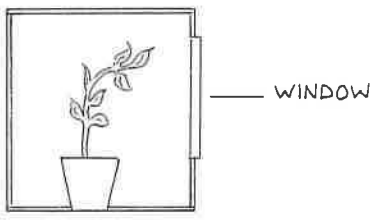
Fig. 3



(*e*) Complete the equation: $\mathbf{Mg + O_2 \rightarrow}$

(*f*) Name the occurrence demonstrated by Fig. 4.

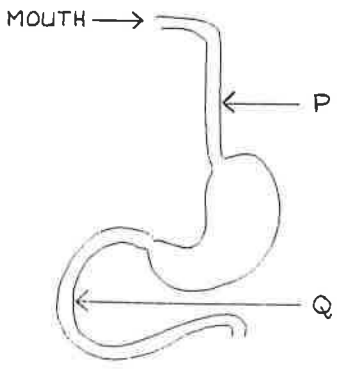
Fig. 4



(*g*) What does a *hydrometer* measure?

(*h*) Fig. 5 shows the human digestive system. Name parts **P** and **Q**.

Fig. 5



(*i*) How would you prevent iron from rusting?

(*j*) What is the difference in the composition of the blood in the right and left ventricles of the heart?

(*k*) What is the cost of using a 2 kW electric fire for 5 hours, if electricity costs 8 p per kilowatt-hour?

(*l*) Fig. 6 shows a section through a leaf. Name parts **A** and **B**.

(*m*) What gas is given off when calcium metal is added to water?

(*n*) Name a stage which occurs between the egg and the adult in the life cycle of the butterfly.

(*o*) What is the name of the instrument in Fig. 7, which is used to measure the length of curved lines?

Fig. 6

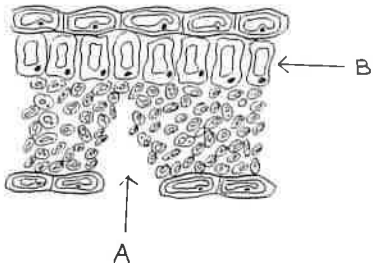
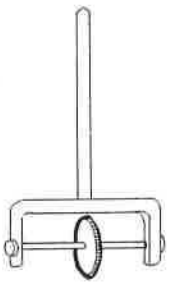


Fig. 7



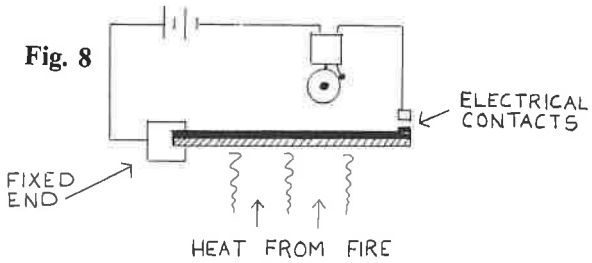
2. (*a*) What charge has:
(i) the electron, (ii) the proton, (iii) the neutron?

(*b*) With the aid of a labelled diagram, describe how you would use electricity to magnetize a steel nail.

(*c*) (i) Fig. 8 shows a model fire alarm. Explain how it works.

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

Fig. 8



3. (*a*) What is the percentage by volume in air of the following:
(i) oxygen, (ii) nitrogen?

(*b*) Using a labelled diagram, describe how you would prepare and collect the gas oxygen in the laboratory.

(*c*) (i) The table opposite shows the causes of reported fish kills in 1989.

Choose *two* of the causes and explain how each of them might have resulted in the death of fish.

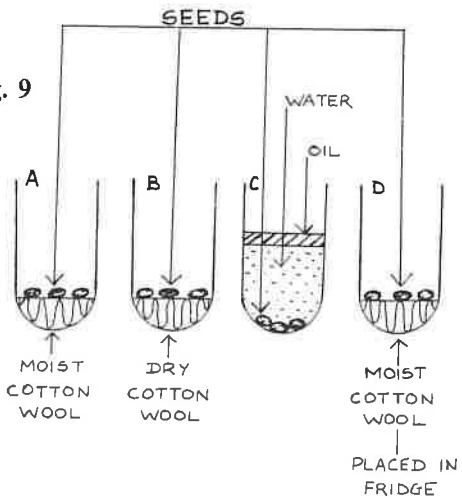
(ii) Explain the likely consequences of a reduction in the amount of ozone in the upper atmosphere.

	No. Fish Kills
Sewage and Water Treatment	12
Construction Works	12
Enrichment	12
Industry	14
Low Water Levels	25
Agriculture	26

4. (*a*) What is (i) a *biennial* plant, (ii) a *perennial* plant? Give *one* example of each.

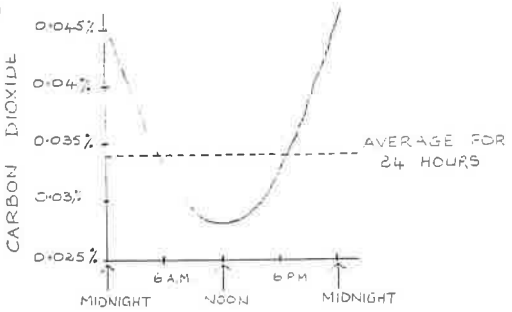
(*b*) Fig. 9 shows an experiment designed to demonstrate the conditions necessary for the germination of seeds. Explain <u>what</u> you would expect to happen in each tube and give the reasons <u>why</u>.

Fig. 9



(*c*) The graph in Fig. 10 shows how the percentage of carbon dioxide, above the surface of a grass field, varied over a twenty four hour period during calm weather. Study the graph and explain the results shown. What was the level at 6.00 p.m.?

Fig. 10



5. (*a*) Give a use for cobalt chloride paper.

(*b*) Using labelled diagrams, describe an experiment to show how you would separate a mixture of sand, salt and water so that a pure sample of each of the three substances is obtained.

(*c*) (i) Name a disease of plants caused by a micro-organism.

(ii) What steps would you take to prevent the outbreak of the disease you have named?

(iii) Give *one* way that the AIDS virus can be passed from one person to another.

6. (*a*) Name *three* ways in which heat may be transferred from one place to another.

(*b*) Using a labelled diagram, describe an experiment to show that light travels in straight lines.

(*c*) A flask of very hot water was placed on a bench and the temperature was read every minute. The results are shown in Fig. 11.

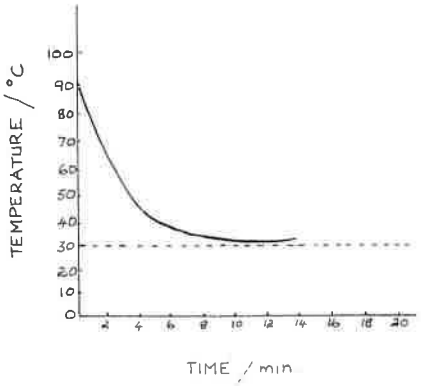
(i) What was the temperature of the water at the beginning of the experiment?

(ii) What was the temperature after *five* minutes?

(iii) What is your estimate of the final temperature of the water?

(iv) Which contains more energy: a gram of boiling water at 100 °C or a gram of steam at 100 °C? Explain your reasoning.

Fig. 11



7. (*a*) (i) Draw a simple diagram of the pH scale.

(ii) What is the pH of a substance?

(*b*) A small volume of sodium carbonate (bread-soda) solution was placed in a dish and it turned red litmus blue. Some milk was added drop by drop, until a solution was produced which had no effect on either blue or red litmus.

(i) Name the process which resulted in the formation of this neutral compound.

(ii) When the solution was heated, a white compound remained. What was the pH of the compound?

(iii) Why is sodium carbonate solution sometimes used to treat wasp stings?

(*c*) (i) Give the chemical symbol for sodium (Atomic number = 11)

(ii) Show the electron structure of sodium.

(iii) What compound is formed when sodium is added to water?

(iv) Give the chemical formula of this compound.

(v) Name *two* elements with chemical properties similar to sodium.

8. (*a*) What is *breathing?*

(*b*) (i) Name the parts labelled **A, B, C, D, E** in Fig. 12.

(ii) State where, in the lungs, gas exchange takes place.

(iii) What is the function of the rings of cartilage in part **A**?

(*c*) Fig. 13 shows an experiment to demonstrate that carbon dioxide is released during breathing.

(i) What liquid would you use in **B** and **D**?

(ii) What difference in appearance between the two liquids would you expect to see at the end of the experiment?

(iii) What does this confirm?

(iv) Why is sodium hydroxide solution used in flask **A**.

9. (*a*) Fig. 14 shows a sound wave. What is the distance **A** called?

(*b*) (i) Name *three* of the parts of the human ear labelled **A, B, C, D, E** in Fig. 15.

(ii) Hearing is one function of the ear. Name a second function.

(iii) Explain how the ear works as a hearing organ.

(*c*) (i) When light is passed through a prism, a spectrum is formed. Give the seven colours of light seen.

(ii) Fig.16 illustrates a common eye problem. Explain what the problem is and give its name.

10. (*a*) In ecology, what is: (i) a producer, (ii) a consumer?
Give an example of each.

(*b*) Describe an experiment to find the percentage of humus in a soil sample.

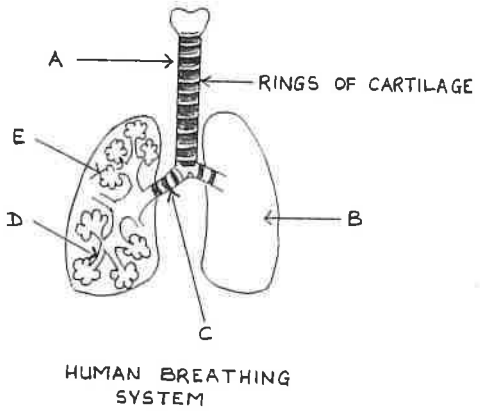
(*c*) The table opposite shows the results of a plant study on a patch of ground of area 500 square metres, using a one metre quadrat.

(i) Which plant occurs most frequently?

(ii) Calculate the total number of this plant in the whole area.

(iii) How would you ensure that the quadrats measured gave you a true estimate of the numbers of each plant in a field?

Fig. 12



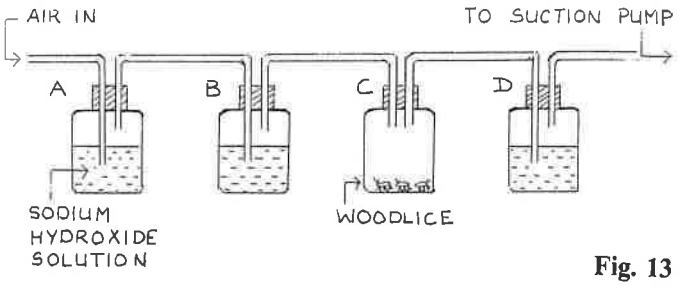


Fig. 13

Fig. 14

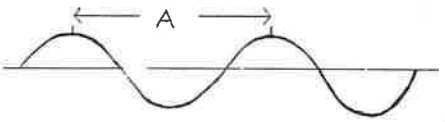
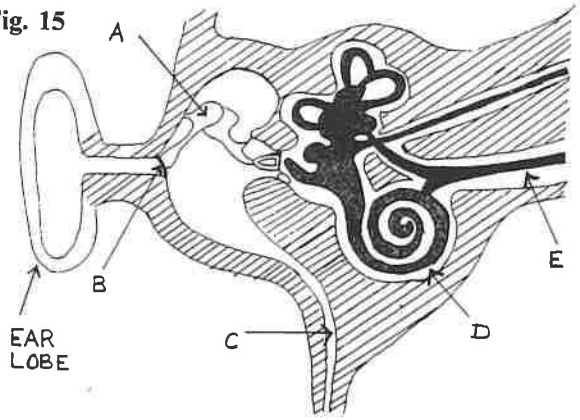


Fig. 15



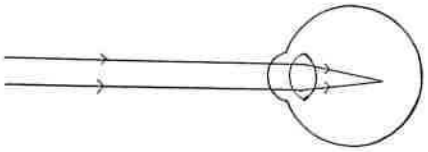


Fig. 16

Quadrat	No. of Daisies	No. of Thistles	No. of Plantains	No. of Docks
1	5	3	4	6
2	3	2	1	5
3	7	9	2	6
4	3	5	7	9
5	2	3	1	5