

**AN ROINN OIDEACHAIS**  
**INTERMEDIATE CERTIFICATE EXAMINATION, 1976**  
**SCIENCE—SYLLABUS E**

WEDNESDAY, 16 JUNE—AFTERNOON, 2 to 4.30

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

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

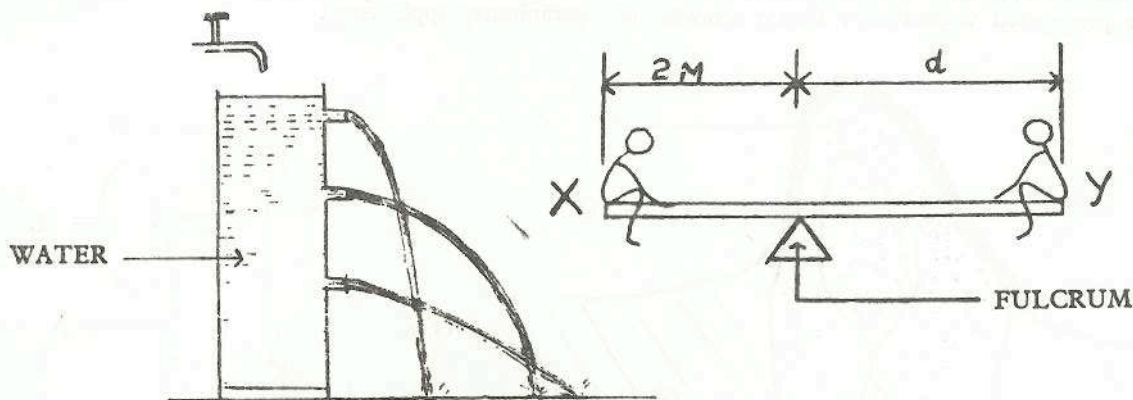


FIG. 1

FIG. 2

- (a) State the principle which the experiment shown in Fig. 1 demonstrates. Give an example of the application of this principle in everyday life.
- (b) What is the pH of a neutral solution?
- (c) In the diagram Fig. 2, a boy weighing 50 kg sits at X, and a boy weighing 40 kg sits at Y. In order to keep the see-saw balanced what will be the distance "d"?
- (d) Which of the following liquids has the lowest boiling point: methylated spirits; water; liquid of paraffin?

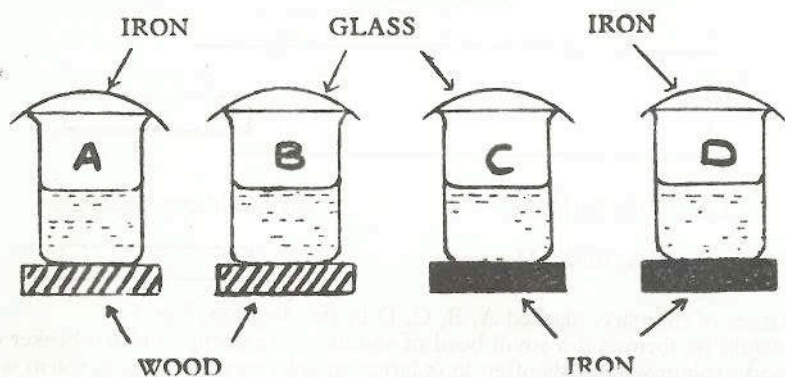


FIG. 3

- (e) Equal volumes of hot water are poured into each of the beakers A, B, C and D shown in Fig. 3. After five minutes, in which of the beakers will the temperature of the water have fallen most?

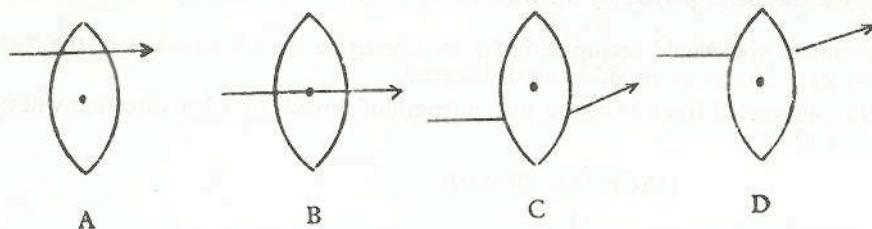


FIG. 4

- (f) Write down which of the diagrams in Fig. 4 represents correctly the path of a ray of light through the lens.
- (g) If the offspring of a cross between two plants were all tall (Tt) in the F<sub>1</sub> generation, what were the genotypes of each of the parent plants?
- (h) Which of the following metals when placed in a solution of dilute acid will not react: aluminium; copper; magnesium; calcium; iron?

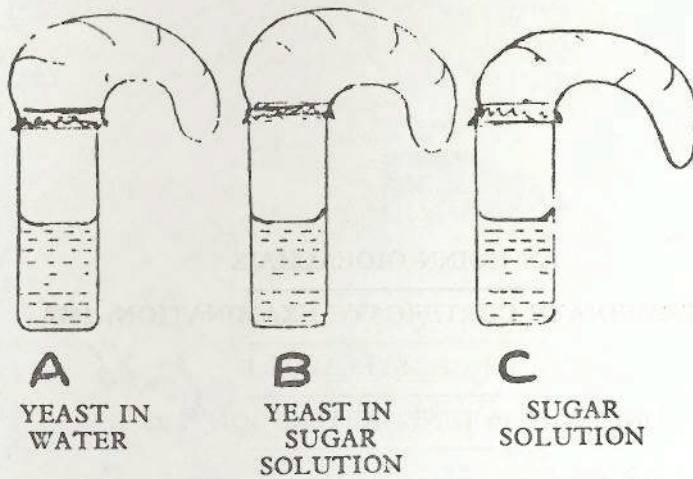
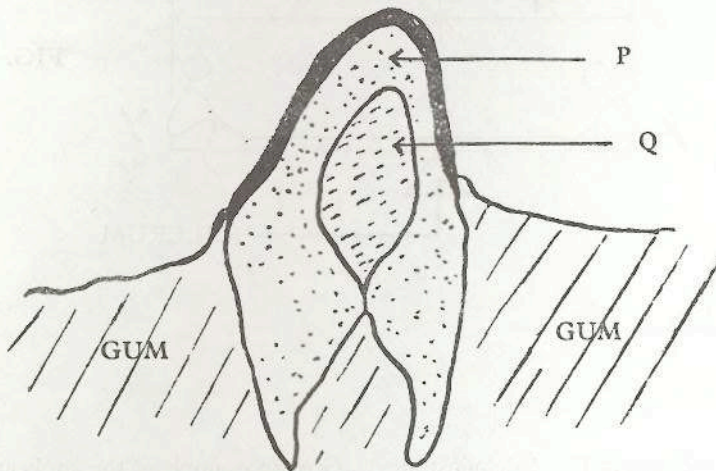


FIG. 5

- (i) The three test tubes A, B and C in Fig. 5 and their contents were placed in a water bath held at a temperature of 37°C. After 3 hours a gas had filled one of the balloons. (i) Which balloon was filled? (ii) What was the name of the gas?
- (j) Write down **one** word in the case of each of the following plants which describes the method by which they are propagated vegetatively: Roses; strawberries; geraniums; apple trees.



SECTION THROUGH TOOTH

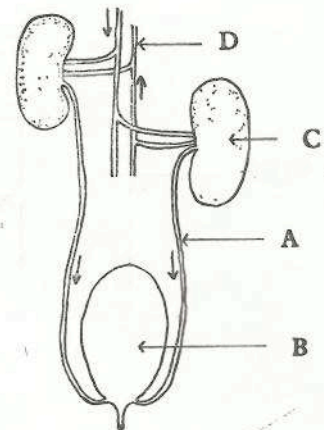
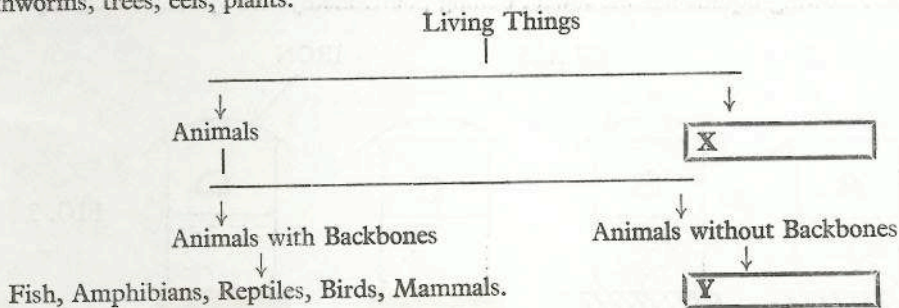


FIG. 7

- (k) Name the parts of the tooth marked P and Q shown in the diagram Fig. 6.
- (l) Make use of two of the following possible answers to fill in correctly the spaces at X and Y: Earthworms, trees, eels, plants.



- (m) Write down the names of the parts marked A, B, C, D in the diagram, Fig. 7.
- (n) What compound would be formed if a small bead of sodium were dropped into a beaker of water?
- (o) Suggest a reason and explain why birds often look larger in cold weather than in warm weather.
2. (a) If you suspected that a particular sample of rock was limestone, describe any simple tests you would perform on it which would help to verify your suspicions.
- (b) (i) Describe how you would determine the air content of a sample of soil.  
 (ii) Briefly describe the parts played by air and living organisms in making soil a suitable medium for plant growth.
- (c) Describe an experiment you would set up in order to investigate the effectiveness of the "wings" on the fruits of sycamore or ash trees as an aid to seed dispersal.
3. (a) If a bar magnet is suspended from its centre with a length of thread, in what direction will it be pointing when it comes to rest?

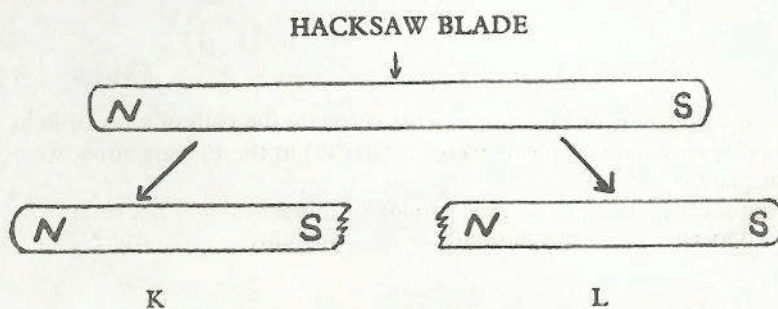


FIG. 8

- (b) The diagram Fig. 8 shows a magnetised hacksaw blade which is then broken into pieces K and L.
- (i) How would you show that each of the broken pieces has a north and a south pole as is shown in the diagram?
- (ii) Suggest an explanation for what happens to the magnetism when the hacksaw blade is broken.

- (c) Copy the circuit shown in the diagram Fig. 9 into your answer book and add to it two wires leading from the points X and Y into a liquid in a beaker. Describe what you would expect to happen when
- the liquid is pure distilled water,
  - the liquid is water and dilute sulphuric acid.

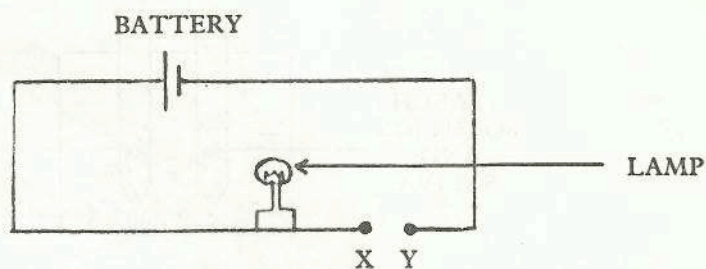
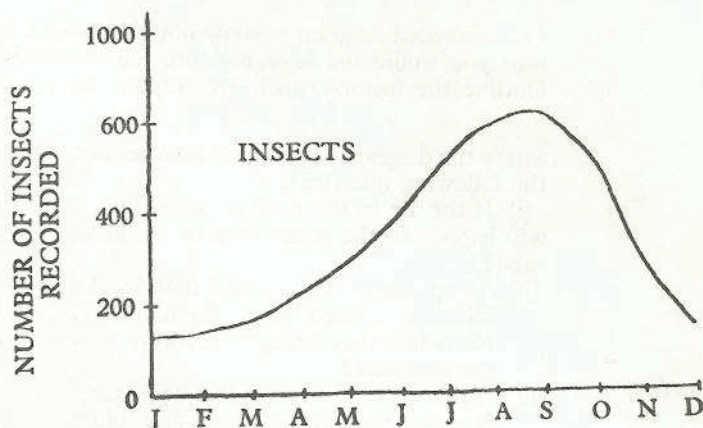
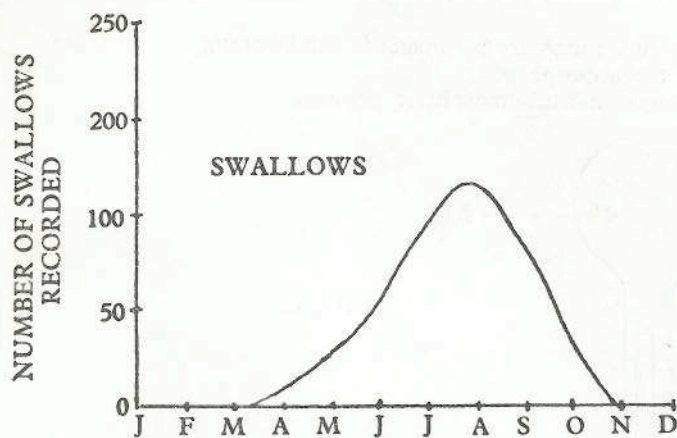


FIG. 9

4. (a) What are annual plants?  
 (b) Describe special features of **two** of the following plants which make them especially suited to their habitat: lesser celandine; honeysuckle; bluebell; crocus; scutch grass; duckweed.  
 (c)



The number of insects and swallows recorded by a student from January to December is shown in the graphs.

- Suggest a reason why no swallows were found either early or very late in the year?
  - Outline what you think might be possible relationships between the trends shown in both graphs. Give reasons for your answer.
5. (a) Explain how you would find out the water content of a sample of milk.  
 (b) A cube of ice is put into a beaker and allowed to melt.
- Is the volume of water obtained from the melted ice cube greater, less or the same as the cube of ice?
  - State how density was affected when the ice melted. Explain your answer.

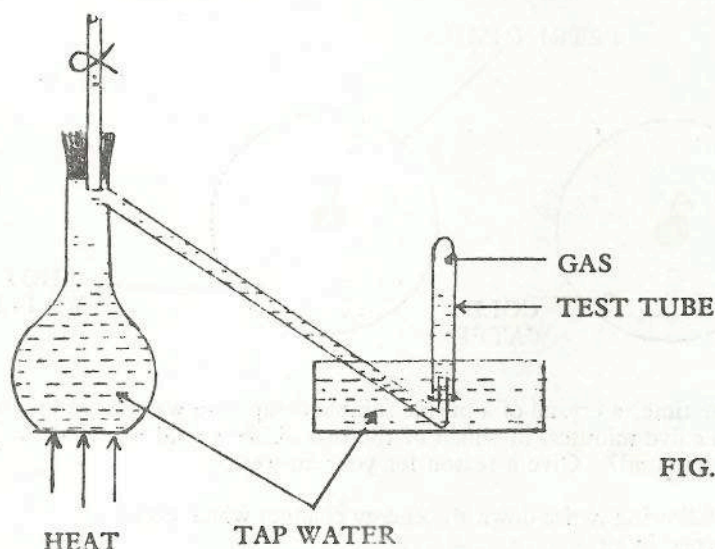


FIG. 10

- (c) The diagram Fig. 10 shows the end of an experiment. Originally the flask, the glass delivery tube and test tube were **completely** filled with water, but when the flask was gently heated for about ten minutes, a gas was collected in the test tube.
- Why is it possible to say that the gas is not water vapour?
  - From the information gained in this experiment suggest how clean warm water poured in large quantities from a factory into a lake, could affect the animal life in the lake.

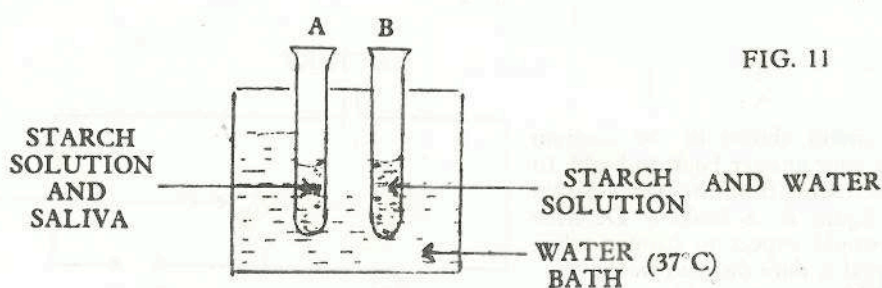


FIG. 11

6. (a) Tests carried out every minute on a sample taken from each of the test tubes A and B, Fig. 11, showed starch present, until the eighth test when *no starch* was found in test tube A, but starch was still present in test tube B.
- What did the starch change to in test tube A? How would you test your answer?
  - What was the special reason for keeping the water bath at a temperature of 37°C?
- (b) Which of the following numbers represents a normal pulse rate per minute for a healthy adult sitting at ease in a well ventilated room: 120; 105; 65.
- (c) (i) What are the main differences between the flowers specially adapted for insect pollination and wind pollination? Give a named example in each case.  
(ii) Briefly outline the differences between the method of reproduction of a mushroom and a typical flowering plant.
7. (a) Use a labelled diagram to show how you would construct a mercury barometer in the laboratory and explain how you would use it to measure the pressure of the atmosphere.  
(b) Outline the factors which are responsible for changes in the atmospheric pressure.

- (c) Study the diagram Fig. 13 and then answer the following questions:

- If the air in the flask is heated, what will happen to the water level in the glass tube?
- An apparatus like this was used by the scientist Galileo as a thermometer. How does this arrangement work as a thermometer?
- If this apparatus was in fact being used as a thermometer, it might give quite different readings on days when the temperature was in fact the same. Explain why.

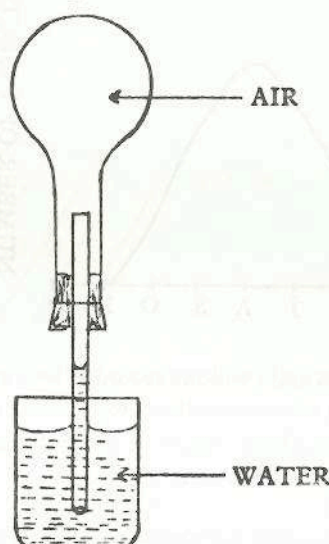


FIG. 12

8. (a) Explain each of the following:—
- why a soap bubble is always spherical in shape.
  - how a "plunger" is able to free blocked waste pipes leading from a sink unit.
- (b) Describe an experiment you would set up to investigate the conditions necessary for germination in seeds.

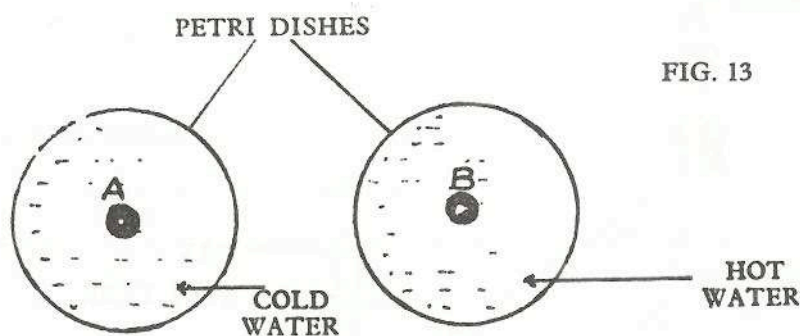


FIG. 13

- (c) At exactly the same time, a crystal of a purple soluble compound was placed on each of the positions A and B. (Fig. 13). After five minutes, in which of the two dishes would you find the greater rate of diffusion of the coloured compound? Give a reason for your answer.
9. (a) In the case of the following, write down the energy changes which occur:—
- a match is burned in air,
  - an electric bell works from a battery.
- (b) (i) Draw the type of wave trace you would expect to get if a sounded tuning fork was drawn over a smoked glass plate. Show also on your drawing one wave-length.  
(ii) Explain why a sounding tuning fork gives a much louder sound when its end is placed on a table.
- (c) Describe a simple experiment you would set up to investigate the behaviour of woodlice to light.
10. A healthy, potted geranium plant with variegated leaves was watered and left in the sunlight for several hours. A leaf was then picked from the plant and tested for starch. It was found that part of the leaf had starch, but the other had no starch.
- What part of the leaf had starch? Explain why.
  - State how you would test the leaf for starch.
  - Name one other condition necessary for photosynthesis and briefly describe one experiment you have carried out which demonstrates this.