

AN ROINN OIDEACHAIS

INTERMEDIATE CERTIFICATE EXAMINATION, 1980

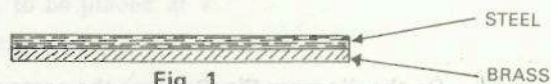
SCIENCE—SYLLABUS E

TUESDAY, 17 JUNE—MORNING, 9.30 to 12.00

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

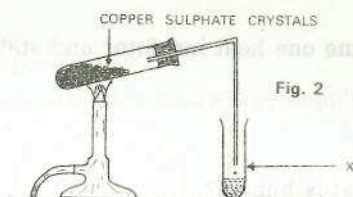
1. Answer ten of the following items. (Keep your answers short).

(a) When the compound bi-metal strip such as that in the diagram Fig. 1 is heated, say what will happen and why.

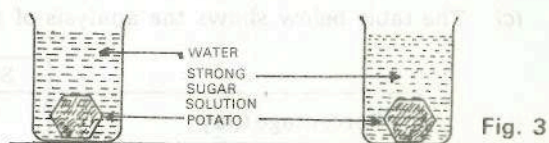


(b) In plant life, give a common name for a ripened ovary.

(c) In the diagram Fig. 2, what liquid collects in the test tube x, when the crystals of copper sulphate are heated?

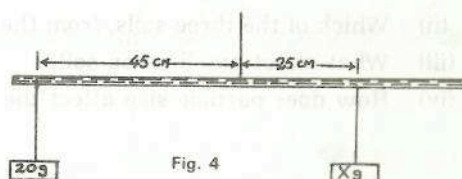


(d) The diagram Fig. 3 shows an experiment set up to investigate the movement of solutions through the cells of a potato. After twelve hours the potato in the water was crisp and fresh while the potato in the sugar solution was shrivelled. Why is this?



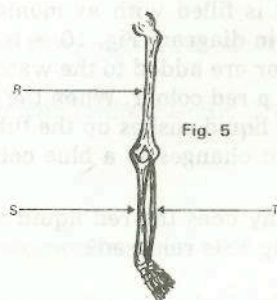
(e) Which of the following is the number of permanent teeth in an adult human: 20; 28; 32?

(f) The diagram Fig. 4 shows a lever in equilibrium. Calculate the value of x.



(g) In the female reproductive system of mammals, where is the egg cell produced?

(h) The diagram Fig. 5 shows the human leg. Name the bones marked R, S and T.



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

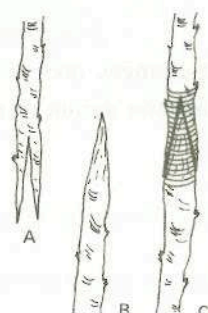
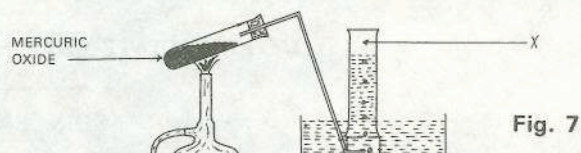


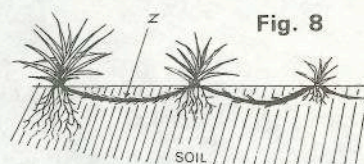
Fig. 6

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

(k) When the mercuric oxide is heated as in diagram Fig. 7, what gas would you expect to collect at X?



(l) The diagram Fig. 8, shows a stem modification by which some plants reproduce vegetatively. Name the structure Z, and give one example of a plant which reproduces in this way.



(m) During a thunderstorm, the flash of lightning is seen before the thunder clap is heard. Why is this?

(n) On the diagram Fig. 9, name the parts of the leaf marked M, N, S and T.



(o) Name one heat insulator and state how it can be used to conserve energy in the home.

2. (a) What is humus?

(b) Describe an experiment to show the presence of micro-organisms in the soil.

(c) The table below shows the analysis of mineral matter in three samples of soil.

	Sample A	Sample B	Sample C
Percentage Clay	70	5	35
Percentage Silt	10	15	10
Percentage Sand	20	80	55

(i) From the data given, state the soil type of each sample.

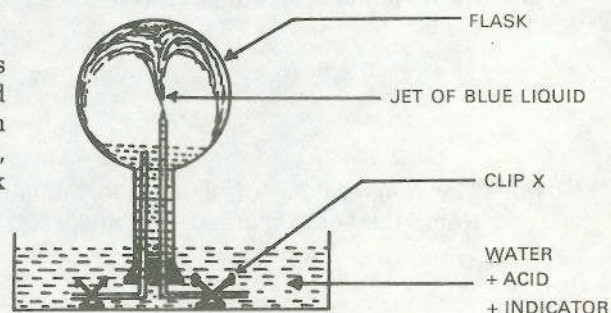
(ii) Which of the three soils, from the table above, is the best general garden soil in your opinion?

(iii) What affect has lime on soil?

(iv) How does particle size affect the movement of water through a soil?

3. (a) Sodium reacts with water to liberate a gas which burns with a "pop". Name this gas.

(b) A flask is filled with ammonia gas and set up as shown in diagram Fig. 10. A few drops of acid and indicator are added to the water in the bath, which gives it a red colour. When the clip at X is released, the red liquid rushes up the tube and into the flask where it changes to a blue colour.



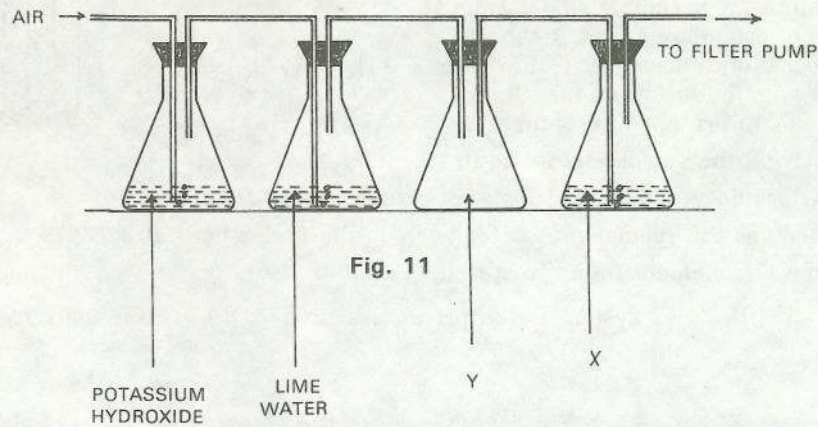
(i) Why does the red liquid rush in when clip X is released?

(ii) Why is there a colour change?

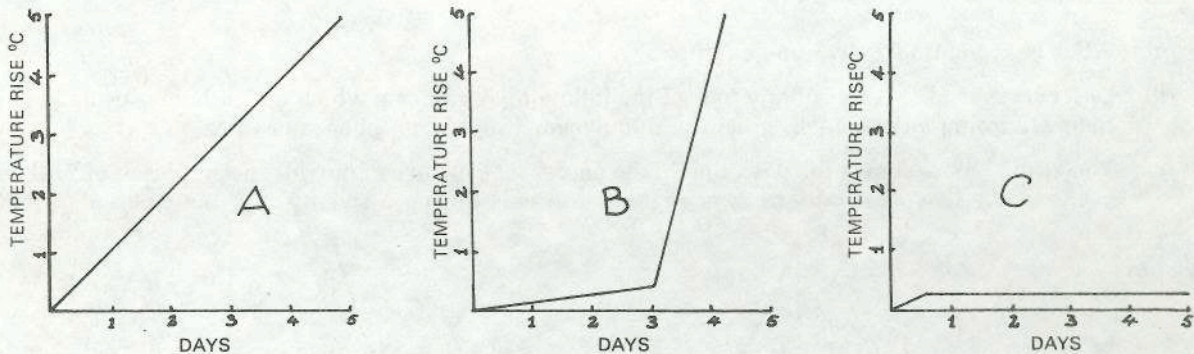
(c) (i) What changes take place in milk during souring?

(ii) Explain the action of sour milk and sodium bicarbonate (bread soda) in the making of bread.

4. (a) Where in the human body does oxygen enter the bloodstream?
 (b) The diagram Fig. 11 shows an experiment to demonstrate that organisms release carbon dioxide while breathing.

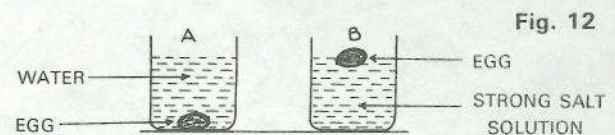


- (i) Name an animal suitable for this experiment, to be placed at Y.
 (ii) State the function of the potassium hydroxide.
 (iii) What liquid would you place at X?
 (iv) If you were to put a plant at Y, what precaution would you need to take?
- (c) The graphs below show the temperature differences recorded in three vacuum flasks:—
 Flask A, containing soaked seeds;
 Flask B, containing soaked seeds which have been boiled;
 Flask C, containing soaked seeds with disinfectant added;
 The three flasks contained equal amounts of soaked seeds and each had a free supply of air.



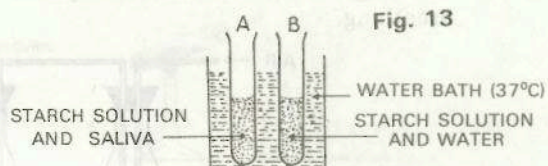
Study the graphs and give reasons for the differences in temperature recorded in the three flasks.

5. (a) In the diagram Fig. 12. A, an egg sinks in water, but the same egg floats in a salt solution, Fig 12. Why is this?



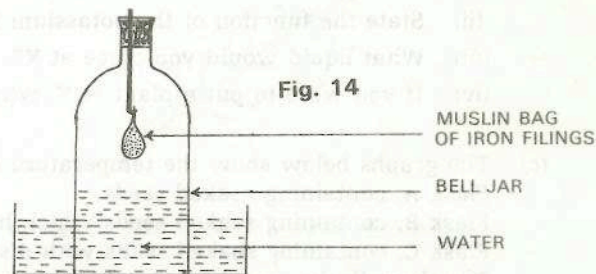
- (b) Describe how you would find the density of a small irregularly shaped object e.g. a small stone.
- (c) (i) A piece of metal weighs 77g. in air and 67g when immersed in water. Calculate the density of the metal.
 (ii) If the same piece of metal weighs 66 g in a liquid X, calculate the Specific Gravity of liquid X.
6. (a) Explain how rainwater helps in the chemical breakdown (erosion) of limestone.
- (b) In a school experiment to investigate the composition of water, an electric current is passed through some water to which a few drops of acid have been added.
 (i) Draw a diagram to show how you would set up this experiment.
 (ii) Why is the acid added?
 (iii) What is the result of the experiment?
 (iv) Give a reason for your answer in (iii) above.
- (c) (i) Is the volume of water obtained from a melted ice cube greater, less, or the same as the volume of the ice cube? Explain your answer.
 (ii) Explain how fish can survive at the bottom of a pond during freezing weather conditions.

7. (a) From the following foods select two which are rich in protein: fish, potatoes, cheese, glucose, peas.
- (b) In the diagram Fig. 13. tests carried out every minute on a sample taken from each of the test tubes A and B 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.



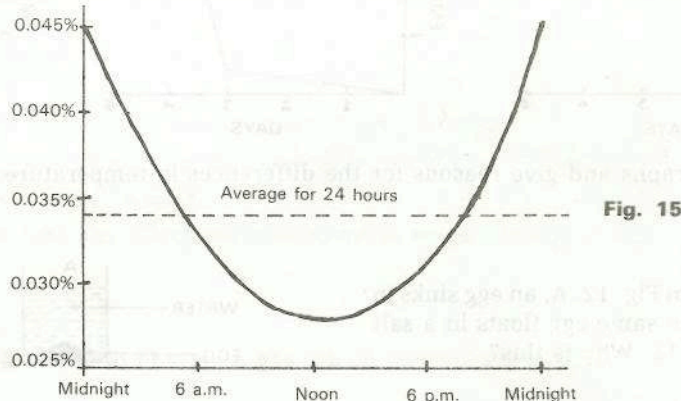
- (i) What did the starch change to in test tube A?
- (ii) How would you test the substance produced in test tube A?
- (iii) What was the special reason for keeping the water bath at 37°C?
- (iv) Name one element found in starch.
- (c) Where in the digestive system is the pH (i) less than 7, (ii) greater than 7? Give reasons for your answers.
8. (a) State the approximate percentage of Nitrogen in the air.
- (b) Describe with the aid of a diagram how you would prepare and collect a sample of carbon dioxide.

- (c) A muslin bag of iron filings is weighed and allowed to rust as in the diagram Fig 14. During rusting the level of the water in the bell-jar rises.



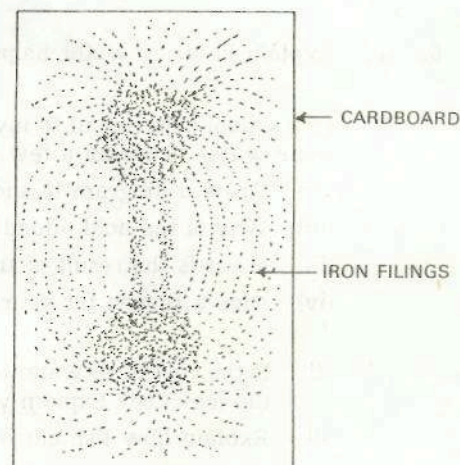
- (i) Why did the level of water in the bell-jar rise?
- (ii) If, after rusting, the iron filings are dried and re-weighed, there is found to be an increase in weight. Explain why this happens.

9. (a) What is a mammal? Give one example.
- (b) Describe special features of any *four* of the following organisms which make them especially suited to their environment: bluebell, greenfly, duckweed, frog, daisy, pheasant.
- (c) The graph below shows the variation in the percentage of carbon dioxide in samples of air, taken from between the leaves of tall grass, at regular intervals during a twenty four hour period.



- (i) When was the carbon dioxide concentration below average?
- (ii) Why was the carbon dioxide concentration above average outside that period?
- (iii) Draw a new graph using the same time divisions as in Fig. 15 to show approximately how the oxygen concentration would vary in the same situation.
- (iv) Name one factor which alters the rate of photosynthesis.

10. (a) A sheet of light cardboard is placed over a strong bar magnet. Iron filings are sprinkled on the cardboard which is then gently tapped. The result is shown in the diagram Fig. 16. What does this result demonstrate?



- (b) Describe with the aid of a diagram how you would show that light travels in straight lines.
- (c) If you were given two plane mirrors, a cardboard box, and some adhesive tape, describe how you would construct an instrument to enable you to see over a barrier which is slightly higher than yourself.

Fig. 16