INTERMEDIATE CERTIFICATE EXAMINATION, 1970

SCIENCE — SYLLABUS B

WEDNESDAY, 17th JUNE — MORNING, 9.30 to 12

SIX questions to be answered, at least **two** from Section I and at least **one** from each of the other two section. All the questions carry equal marks.

SECTION I

1. The following is a list of plants which are commonly found growing in woodland : hazel, primrose, wood anemone, lesser celandine, bluebell, oak, holly, ivy.

   Answer *four* of the following questions in relation to the named plants :

   (a) Which plants belong to (i) the ground layer, (ii) the shrub layer, (iii) the tree layer?

   (b) What is the approximate time of flowering of each plant? How does it help plants to flower at different times?

   (c) What is a catkin and which plant produces catkins?

   (d) Which plants produce underground storage organs and how does this help the plants to survive?

   (e) Which plants produce leaves early in the year?

2. The following experiments were performed with willow twigs which had leaves attached and which were put to grow in water :

   (i) One twig was 'ringed' by removing a complete band, about half an inch wide, of the skin (or soft tissue) down to the wood. The leaves remained fresh each side of the 'ring'.

   (ii) The other twig was 'ringed' in the same way, but the ring was fairly close to the base of the twig and all leaves below the ring were removed. Adventitious roots grew from the stem above the ring, but not below.

   Answer the following questions :

   (a) What was the purpose of the experiments?

   (b) What conclusions do you draw from the experiments?

   (c) Show by means of a cross-section the position of the tissue which enables stems to increase in thickness.

3. Write a short illustrated account of the variety of plants and animals you found in a named water habitat you studied. State how the organisms you name obtain their food and how they are adapted to the particular habitat.

   In what way does your answer illustrate (a) a food chain, (b) a pyramid of numbers?

4. Assume that you are given a mammal (for example a rabbit) for dissection. How would you recognise the following : (a) the pylorus, (b) the liver, (c) the pancreas, (d) the spleen, (e) the bile duct?

   Describe an experiment you performed in order to investigate the action of a named digestive juice.

5. What are the characteristics of a fertile soil? Contrast two soils you have studied, one of which was fertile and the other infertile. In the case of the infertile soil state reasons for its infertility.

6. During the year a woman wrote to a newspaper to say that she had a very good apple tree growing in her garden and that she had raised it from a seed some years previously.

   (a) What method is usually used to propagate apple trees? Give a brief account of it.

   (b) Why was the woman evidently surprised when the tree turned out to be productive?

   (c) What are the advantages and disadvantages of the method commonly used to propagate apple trees as compared with the method used by the woman mentioned above?

[P.T.O.

SECTION II

7. Name three allotropes of carbon. Describe, with the aid of a diagram, how you would show that the different allotropes of carbon are all forms of the same element.

8. Describe, with the aid of drawings, how you would investigate the action of an acid on (a) a metal, (b) a carbonate.

9. (a) What weight of nitrogen is contained in one ton of anhydrous ammonium sulphate $[(NH_4)_2SO_4]$?

   [Atomic weights: $N = 14$; $H = 1$; $S = 32$; $O = 16$]

   (b) Explain in words the information given in the following equations and, in each case, state how the reaction takes place:

   (i) $4P + 5O_2 = 2P_2O_5$

   (ii) $2Mg + O_2 = 2MgO$

   (iii) $P_2O_5 + 3H_2O = 2H_3PO_4$

SECTION III

10. Describe two different methods you would use to find the density of a liquid.

    Milk (specific gravity 1·032) and water are mixed in the ratio 5:1. Find the density of the mixture.

11.
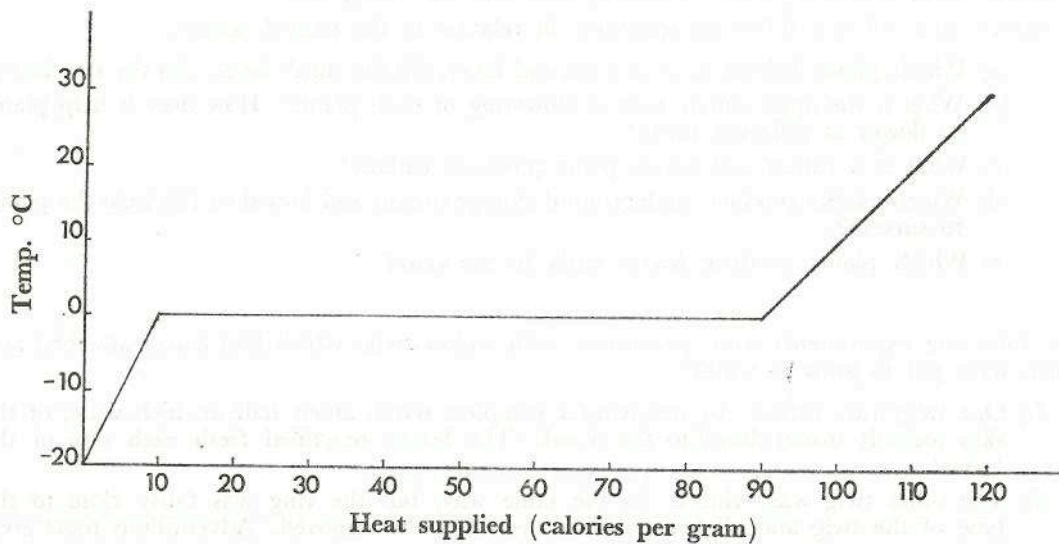
The graph shows how temperature varies when ice is heated.

   (a) How do you interpret the graph?

   (b) Calculate the quantity of heat required to change 20 gm. of ice at $-5°C$ to water at $30°C$.

12. If you were given a J-tube (short arm closed) and mercury, how would you investigate the relationship between the volume of gas (air) and the pressure to which it is subjected.