

AN ROINN OIDEACHAIS

(Department of Education).

BRAINSE AN MHEADHON-OIDEACHAIS

(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1925

SCIENCE (Syllabus B).

TUESDAY, 23rd JUNE.—MORNING, 10 A.M. to 12 NOON.

[Not more than *six* questions are to be attempted.]

1. The corners of a four-sided field with straight fences are *A*, *B*, *C*, and *D*—

$$AB = 4.35 \text{ chains;}$$

$$BC = 7.50 \text{ chains;}$$

$$CD = 5.95 \text{ chains;}$$

$$DA = 8.30 \text{ chains;}$$

$$BD = 10.00 \text{ chains.}$$

Draw a plan of the field to a scale of 2 chains to 1 inch, and find its acreage.

2. A coping stone of a bridge fell into a river. One of the workmen who replaced it stated that the stone gained weight when it was lifted out of the water. Do you agree with this statement? Give your reasons.

The volume of the stone was $1\frac{1}{2}$ cubic feet and its density was $2\frac{1}{2}$ times that of water which weighs 62.5 lb. per c. ft. If the stone were totally immersed, what vertical force was required to raise it off the bottom of the river?

3. Describe a thermometer, and explain why its stem is of very narrow bore.

How would you compare the expansion of two liquids under the action of heat?

4. In what ways may heat be transferred from one place to another? Give illustrations.

5. Explain fully why the rainfall in the west of Ireland is usually heavier than that in the east.

6. Make labelled sketches of a bean or pea seed showing the internal structure. What does each part develop into when fully grown?

7. How would you determine the amount of (a) water, (b) organic matter, (c) mineral matter in a soil? What use do the roots of plants make of the air in the soil?

8. Give experimental evidence to explain (a) the conditions under which iron rusts; (b) the nature of the changes produced by rusting.

What precautions can be taken by the farmer to protect his implements from these destructive changes?

9. Write an account of the changes that occur in a lime kiln; contrast the properties of limestone and lime. Describe the uses made of each of these substances on the farm.

10. Briefly explain the production of nitrogenous manure by destructive distillation as in a gas-works. Why would it be undesirable to manure land simultaneously with lime and sulphate of ammonia?