AN ROINN OIDEACHAIS
(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1935.

FULL COURSE.

SCIENCE (Syllabus A).

MONDAY, 17th JUNE.—AFTERNOON, 4 TO 6 P.M.

[Not more than *six* questions to be attempted. All questions carry equal marks. Illustrate your answers wherever possible.]

1. How would you measure the pressure (*a*) of the atmosphere; (*b*) of the gas supply ? Sketch and describe the instruments used.

2. State the Principle of Archimedes.

The envelope of an air-ship contains 2 million cubic feet of helium of density ·01 lb. per c. ft. It displaces air of density ·075 lb. per c. ft. Calculate its total lifting power in tons.

3. State Boyle's Law.

A narrow glass tube of uniform cross-section is closed at one end and contains air enclosed by a mercury thread 5 cm. long. The column of enclosed air is 16·1 cm. long when the tube is vertical with the open end uppermost and is 18·4 cm. long when the tube is vertical with the closed end on top.

Calculate the barometric pressure.

4. Distinguish between the conduction, convection, and radiation of heat.

(*a*) How does the heat of a fire reach us ?

(*b*) How would you show by experiment that water is a poor conductor of heat.

5. (*a*) Explain briefly how you would measure the specific heat of a liquid if you were given a solid of known specific heat.

(*b*) Calculate the specific heat of alcohol from the following figures:

Mass of Aluminium Calorimeter ..	7·14 gm.
Mass of Calorimeter and alcohol ..	82·48 gm.

Initial temp. of alcohol	.. ..	12·2°C.
Mass of hot aluminium added	..	19·3 gm.
Initial temp. of aluminium	.. ..	100·7°C.
Final temp. of the whole	.. ..	19·8°C.
Specific heat of aluminium	.. ..	0·22 cal./gm./°C.

6. What is meant by the latent heat of fusion of a substance ?

A calorimeter of negligible heat capacity contains 200 gm. of water at 26°C. 43·7 gm. of dry ice at 0°C are melted in it and lower the temperature of the water to 7°C. Calculate the latent heat of fusion of ice.

7. What happens when the following substances are heated :—

(*a*) chalk ;

(*b*) Ammonium Nitrate ;

(*c*) Copper Sulphate.

Mention the chief properties of the products formed in each case.

8. How would you prepare chlorine ? Give its chief properties and mention one of its uses.

9. What is meant by

(*a*) efflorescence ;

(*b*) deliquescence ;

(*c*) sublimation ;

(*d*) catalysis.

Give one example in each case.

10. A metre stick weighing 100 grams balances horizontally when suspended by a thread passing through the 50·1 cm. mark. The thread is then changed to the 30 cm. mark and the lever kept horizontal by hanging a stone from the 13·5 cm. division. The stone is now immersed in water and the lever again balanced by moving the point of suspension of the stone from the 13·5 mark to the 3·5 cm. mark.

(*a*) Find the weight of the stone.

(*b*) Find the specific gravity of the stone.

11. Describe how you would use a single known weight to find the weight of an object by applying the principle of the Triangle of Forces.

12. What is meant by the work done by a force ?

A smooth plane is inclined at 30° to the horizontal.

(*a*) How much work is required to pull a mass of 2 lb. one foot up along the plane.

(*b*) What force acting parallel to the plane will just pull it up ?