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(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS
(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1930.

SCIENCE (Syllabus A).

WEDNESDAY, 18th JUNE.—MORNING, 10 A.M. TO 12 NOON.

[Not more than six questions to be attempted. Illustrate your answers wherever possible.]

1. How would you determine:—

(a) the thickness of the walls of a gas-jar.

(b) the volume of a flat plate of metal of irregular shape and uniform thickness? (40 marks.)

2. How would you compare experimentally the readings of Centigrade and Fahrenheit thermometers? The following results were obtained:—

°C	15	20	30	40	50	60	70	80	90
°F	59	68	86	104	122	140	158	176	194

Plot a graph of these results.

(40 marks.)

3. You are provided with hydrochloric acid, and solutions of caustic soda and litmus. How would you prepare (a) a neutral solution; (b) a clean dry specimen of common salt? (40 marks.)

4. How would you find the weight of a body using (a) a lever; (b) a spiral spring? (40 marks.)

5. How would you obtain pure specimens of sand, salt, and salammmoniac from a mixture of these substances? Give reasons for your methods. (50 marks.)

6. State Boyle's Law and Charles' Law.

Describe an experiment you would perform to test the truth of Boyle's Law for pressures greater and less than atmospheric pressure. (50 marks.)

7. How would you determine:—

(a) the average thickness of a penny without using a micrometer screw;

(b) the weight of a wooden rod by flotation? (50 marks.)

8. Make a sketch of a uniform metre stick suspended from its centre of gravity (50cm. mark). At the 10cm. mark a weight of 50gm. is suspended, and at the 75cm. mark a piece of metal having a volume of 10 c.c. is suspended, so that the lever is in equilibrium. The metal is then immersed in water: through what distance, and in what direction must the metal be moved to restore equilibrium? (50 marks.)

9. Define "Latent Heat of Fusion." How would you find the latent heat of fusion of ice? 10 grams. of ice at 0°C . are mixed with 120 grams of water at 45°C . All the ice melts, and the temperature falls to 35.4°C . What is the latent heat of fusion of ice? (50 marks.)

10. What is the action of hydrochloric acid on carbonates? Describe an experiment you would perform to find the volume of gas evolved by the action of hydrochloric acid on 1 gram of calcium carbonate. Illustrate your answer by a sketch. (50 marks.)

11. What is understood by Coefficient of Expansion of a liquid? Describe an experiment for finding the coefficient of expansion of a liquid. The following results were obtained experimentally:—

Weight of density bottle	= 29.67 grams.
Weight of density bottle full of liquid at 18°C .	= 38.94 grams.
Weight of density bottle full of liquid at 100°C .	= 38.25 grams.

Calculate the coefficient of expansion of the liquid. (50 marks.)

12. How is "Work" measured? A force of $1\frac{3}{4}$ lbs. weight is just sufficient to pull a body weighing 4 lbs. slowly up an inclined plane $4\frac{1}{2}$ feet long and $1\frac{1}{2}$ feet high. Find (a) the work done in pulling the body along the plane; (b) the work done in raising the body the height of the plane; (c) the work done in overcoming friction. (50 marks.)