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(Department of Education).

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(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1939.

FULL COURSE.
SCIENCE (Syllabus A)

FRIDAY, 16th 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 You are given a solid metal cylinder.

Describe two distinct methods of determining its volume.

State in each case :—

(a) what further experimental work, if any, would be necessary to determine the specific gravity of the metal ;

(b) how the specific gravity would be calculated from the results obtained.

2 Using a Boyle's Law Apparatus, a student got the following results :—

B in Cm. ..	13·5	14	15	16	17	17·4
C in Cm. ..	3·6	7·1	15	24·4	36	41·4

A=height of the closed end above the bench and is constant at 25 cm.

B.=height of the mercury in the closed end above the bench.

C=height of the mercury in the open end above the bench.

The barometer is constant at 76 cm.

From the above results find and plot a series of values for P and $\frac{1}{V}$.

State what your graph tells you.

3. In what units is pressure measured ?

How would you construct a mercury barometer ?

How would you find if there is any air above the mercury in the tube ?

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

How would you determine the latent heat of fusion of ice experimentally ?

How much ice at 0°C. could be melted by 40 gm. steam at 100°C. ?

Latent heat of fusion of ice=80 calories.

Latent heat of steam=538 calories.

5. What do you understand by "Coefficient of Linear Expansion?"

Sketch the apparatus by means of which you could find the coefficient of linear expansion of a solid.

State briefly how you would use it.

Give five examples of the practical effects of expansion.

6. What do you understand by:—

(a) calorie;

(b) specific heat?

Describe in detail a method of determining with reasonable accuracy the specific heat of a solid.

7. What happens when

(a) a stream of hydrogen is passed over heated copper oxide;

(b) phosphorus is ignited over water under a belljar;

(c) limestone is strongly heated;

(d) washing soda is left in air;

(e) sulphuric acid is poured on washing soda?

What substances result from these reactions?

8. How is hydrogen chloride prepared in the laboratory?

Sketch the apparatus used.

What are the principal properties of this substance?

9. Explain what happens when iron rusts.

Describe experiments you have performed to determine the conditions necessary for the rusting of iron, stating what each experiment shows.

What methods are commonly used to prevent iron from rusting?

10. Define:—

(a) force;

(b) weight;

(c) centre of gravity.

How would you determine the centre of gravity of a piece of cardboard of irregular shape?

Explain your procedure.

11. State the "Triangle of Forces."

A body, weighing 20 lb., is kept in equilibrium on a smooth plane inclined at 30° to the horizontal by (a) a force parallel to the plane; (b) a horizontal force.

Find the force required and the reaction of the plane in each case.

12. What is meant by "the moment of a force about a point?"

State the "Principle of Moments."

How would you verify it experimentally in the case of a lever suspended horizontally at a point which is not its Centre of Gravity?