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INTERMEDIATE CERTIFICATE EXAMINATION, 1957.

SCIENCE (Syllabus A).

WEDNESDAY, 12th JUNE.—EVENING, 3 TO 5.30.

[Not more than *six* questions are to be attempted, of which *three* must be taken from Section I, and *three* from Section II. Illustrate your answers by means of diagrams wherever possible.]

SECTION I.

1. What is meant by specific gravity ?

Describe exactly how you would use a density bottle to measure (a) the specific gravity of a given liquid, (b) the specific gravity of sand.

[66 marks.]

2. Describe how you would construct a mercury barometer and explain the necessity for taking certain precautions in constructing it.

Explain (a) how the barometer measures the pressure of the atmosphere, (b) what happens when ether is introduced into a mercury barometer.

What causes changes in atmospheric pressure ?

[66 marks.]

3. Describe, with the aid of diagrams, (i) how you would measure the melting-point of a given substance, (ii) how you would measure the boiling-point of a given liquid, (iii) how you would demonstrate the effect of increased and reduced pressure on the boiling-point of water.

[66 marks.]

4. Define (a) calorie, (b) specific heat.

Describe how you would measure the specific heat of a given liquid and give details of the precautions you would take to obtain a reasonably accurate result.

A copper calorimeter weighing 10 gms. contains 30 gms. of water at 14°C . If 8 gms. of aluminium at 98°C . are placed in the water, what will be the temperature of the mixture in the calorimeter ? (Assume specific heat of copper = 0.09, and specific heat of aluminium = 0.22.)

[67 marks.]

5. State (i) Boyle's Law, (ii) Charles' Law, and describe an experiment to demonstrate *one* of them.

The volume of a given mass of gas, at 27°C . and at a pressure of 700 mm. of mercury, is 1,520 c.c. Find its volume at S.T.P.

[67 marks.]

SECTION II.

6. Describe what may be observed and name the products formed when

- (a) potassium chlorate is heated,
- (b) hydrochloric acid is poured on limestone chips,
- (c) water is added to quicklime,
- (d) carbon dioxide is passed through lime water,
- (e) nitric oxide is exposed to the air,
- (f) a mixture of litharge and carbon is heated.

[66 marks.]

7. Describe, giving one example in each case, (i) crystallisation, (ii) distillation, (iii) sublimation.

Given a solution containing sal ammoniac and common salt, describe exactly how you would obtain from it a pure sample of (a) water, (b) sal ammoniac, (c) common salt.

[66 marks.]

8. Give an account, with examples, of how oxides are classified.

Describe with the aid of a diagram how you would prepare and collect nitrous oxide and describe its properties.

How would you show that nitrous oxide contains (i) nitrogen, (ii) oxygen?

[66 marks.]

9. Give an account of the allotropic modifications of sulphur, and describe how they may be prepared.

Describe what may be observed when burning sulphur is lowered into a jar of oxygen. Name the product formed and describe its properties.

[67 marks.]

10. What is the chemical equivalent of an element?

Describe fully how you would measure the chemical equivalent of magnesium by displacement of hydrogen.

When 1.99 gms. of a certain oxide were reduced 1.59 gms. of the metal were obtained. Find the equivalent of the metal.

[67 marks.]