

second with that between the second and third.

6. Explain the harmonic scale, the diatonic scale and the equally-tempered scale; and give reasons for the wide use of the last.

7. Describe how the air in an open organ tube vibrates, and give a method of investigating it.

8. What is meant by saying that the index of refraction from air to water is $\frac{4}{3}$?

Explain, with diagram, total reflexion.

9. An object is placed between two plane mirrors which are at right angles. Draw rays to show how the eye sees the different images.

10. A standard candle and a 4-candle power gas flame are placed 6 feet apart; where must a screen be placed on the line joining the candle and the gas flame so that it may be equally illuminated by each of them?

FORM II.

PHYSICS.

NOTE — Experiments must be adapted for performance in an ordinary school.

1. A body moves from rest under a constant acceleration. Give an experimental method of investigating the distances passed over in each of the first three seconds of its motion; also find the average speed during each of these seconds; and describe, as clearly as you can, the manner in which the motion takes place.

2. (a) State, as fully as you can, the various forms of energy, giving illustrations in each case.

(b) A piece of lead on an anvil is given a vigorous blow. What transformations of energy take place here?

3. (a) A few drops of water are sprinkled on a plate of glass, which is then held in a horizontal plane with

the wet side downwards. What inferences can you draw from this simple experiment?

(b) Give simple experiments to illustrate *ductility*, *plasticity*, *tenacity*.

4. (a) Give three distinct experiments which illustrate the phenomena of *surface tension*.

(b) How would you determine the amount of the buoyant force which a liquid exerts on a body?

5 (a) How would you find the specific gravity of a piece of cork, using a lead sinker? Give a numerical example.

(b) Explain the method of finding the specific gravity by balancing columns of liquids.

6. (a) Give three experiments which show that a solid body expands when heated.

(b) A bar of iron is riveted to a bar of brass and then held in a strong flame. Describe what happens and deduce any conclusions.

7. Describe fully an experiment to determine at what temperature water has the greatest density.

8. (a) Give an experiment to show that the boiling point of water depends on its pressure.

(b) How would you find the specific heat of some shot?

TECHNICAL EDUCATION.

In view of the agitation that is now in progress with regard to technical instruction in our public schools the following extract from a recent number of the *Scientific American Supplement* is of especial interest:

A very interesting feature of primary education in Russia, says *Nature*, is the establishment and rapid development of small farms, orchards and kitchen gardens in connection with many primary schools, especially in the villages. The land for such model gardens, or farms on a small