

NATURAL PHILOSOPHY.

1. What power (in pounds) is required to maintain a barrel weighing 150 pounds on an inclined plane? Plane inclined at an angle of 45° to the horizon.

2. A power, $\sim$ 6 pounds, applied at the end of a bar of metal of uniform thickness and density, balances a weight = 64 pounds, applied 4 inches from the fulcrum. The bar acts as a lever of the 1st class, and is 3 feet 6 inches long. Determine the pressure exerted by the system upon the fulcrum.

3. State the conditions of equilibrium of floating bodies.

4. Distinguish between :—

(i.) Mass and Weight ;

(ii.) Density and Specific Gravity.

5. What pressure must be exerted upon a cylinder of fir wood, the volume of which = 94.248 cubic inches, that it may be totally submerged in water? (Weight of cubic inch of water = 252.456 grains).

6. Explain the theory of the Siphon.

7. How may the centre of gravity of a body be determined experimentally?

8. A cylinder of wood 10 inches high sinks to a depth of $5\frac{1}{2}$ inches in water, to a depth of 7 inches in another liquid. What is the specific gravity of the latter liquid?

9. The diameter of the plate of a drostatic bellows is 16 inches, a weight of 180 pounds is placed upon it ; what will be the height of the water in the pipe? Diameter of pipe one inch.

SCIENCE.

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Intermediate.

CHEMISTRY.

1. What experiments would you perform to demonstrate the properties of Chlorine?

(In answering this question employ dia-

grams of apparatus used to illustrate the description of your experiments.)

2. In the evolution of Ammonia from Li-
quor Ammoniac by heat aqueous vapour passes over with the gas. Describe a method for drying the Ammonia.

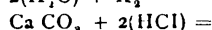
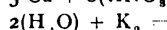
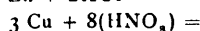
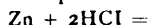
3. Describe and figure the apparatus used for the evolution of Hydrogen from Zinc and Sulphuric Acid.

4. What takes place when a cylinder filled with Nitrogen Dioxide is inverted over a cylinder filled with Oxygen? Write out the equation representing the reaction.

5. How much Potassium Chlorate is required to furnish 12 litres of Oxygen measured at 0°C . and 760^{mm} P.?

6. Explain method of preparing the amorphous variety of Sulphur.

7. Complete the following equations :



8. (i.) Compare the properties of Oxygen with those of Nitrogen Monoxide.

(ii.) What test may be employed to distinguish between these two Gases?

CLASSICS.

G. H. ROBINSON, M.A., WHITBY, EDITOR.

ANSWERS TO CORRESPONDENTS.

N.B.—Smith's Dictionary of Greek and Roman Biography and Mythology (3 vols.), is the standard book of reference on these subjects. It is expensive. The abridgment by the author will probably serve your purpose. Anthon's Classical Dictionary is a very useful book, though growing somewhat obsolete. *Lempriere* is now only a curiosity for the book-hunter.

SCHOOL-BOY.—Take the advice of your teacher. He is right, of course. A good knowledge of classics is obtained only by years of study. Above all, be patient. Avoid "cribs," and do not look into a "translation" until you can translate your author literally, and then see that your translation