

inches? (The rope regarded as perfectly flexible, and the whole weight being supposed to act along its centre.)

8. Describe Nicholson's Hydrometer.

9. Distinguish between

(i.) Mass and weight;

(ii.) Density and specific gravity.

10. Define the term "equilibrium," and distinguish between stable and unstable equilibrium.

11. Demonstrate that two liquids will be in equilibrium in communicating vessels when the altitudes of their columns are to each other inversely as their specific gravities.

EUCLID.

(Usual abbreviations permitted.)

1. A parallelogram is a rectilinear figure whose opposite sides are parallel, and whose opposite angles are equal.

Show clearly what is deficient and what redundant in this definition.

2. The three angles of a triangle are together equal to two right angles.

Prove this; and by its means show how to divide a right angle into three equal parts.

3. Triangles upon the same base and between the same parallels are equal to one another.

Prove this; and thence show how to change an irregular four-sided figure into an equal triangle.

4. Given three straight lines, show how to construct a triangle having these lines for sides. Can it always be done? Explain fully.

5. If a straight line be bisected and also cut into two unequal parts, give the relations existing among the segments as expressed in two propositions of the Second Book of Euclid, and prove one of these propositions.

6. Do *one only* of the following:—

(a) If A, B, C be the angular points of a triangle, find an expression for the perpendicular from A upon the side BC in terms of the sides.

(b) If from any point in the circumference of a circle two lines are drawn to the extremities of a diameter, the sum of the squares upon these lines is constant; and the angle

contained by these lines is a right angle. [No reference to Euclid, Bk. III.]

7. What proposition of the Second Book would be formed from Euclid II. 12, by bringing the vertex A down to the point D in the side BC produced?

The solution to question 8, Intermediate Examination, was omitted in the July-August number. Both are now inserted:

8. A sells an article at a certain advance per cent. on the cost to B , who, in turn, at the same advance per cent., disposes of it for \$19, finding that had he sold for \$13 he would have lost per cent. $1\frac{1}{2}$ of what he now gains per cent. What did A pay for the article?

As regards B , per question, \$19 - profit = \$13 + $\frac{1}{2}$ profit; $\therefore$ profit = \$8; $\therefore$ cost to B is \$16 $\frac{1}{2}$. Hence advance per cent. is $\frac{8}{16\frac{1}{2}}\%$; therefore A paid for the article \$14 $\frac{1}{7}$.

MODERN LANGUAGES.

JOHN SEATH, B.A., ST. CATHARINES, EDITOR.

NOTE.—The Editor of this Department will feel obliged if teachers and others send him a statement of such difficulties in English, History, or Moderns, as they may wish to see discussed. He will also be glad to receive Examination Papers in the work of the current year.

ENGLISH.

EDUCATION DEPARTMENT, ONTARIO.

JULY EXAMINATIONS, 1882.

GEOGRAPHY.

1. (i.) Name in order, beginning at the north and ending at Mexico, the Provinces of the Dominion and the States of the American Union on the eastern side of North America that possess one or more seaports; (ii.) name an important seaport in each; (iii.) state the chief export or exports from each such seaport; and (iv.), if it is situated at the mouth of, or upon a large river, name that river.

2. (i.) Contrast the physical characteristics of Northern and Southern Europe.