

Chemistry.

Examiners—Prof. J. Emerson Reynolds, M.D., F.R.S., Prof. T. E. Thorpe, Ph.D., F.R.S.

1. How is ammonia gas prepared? How can it be shown that it is composed of hydrogen and nitrogen? Explain what happens when a stream of chlorine gas is passed through an aqueous solution of ammonia.

2. State the average composition of atmospheric air. What evidence would you cite in support of the statement that air is a gaseous mixture? How do you explain the apparent constancy in composition of air?

3. What volume of carbon dioxide at 0° and 760 mm. can be obtained from ten grammes of pure marble? What changes occur when the pure gas is passed (a) into lime water; (b) over heated metallic sodium; (c) over red-hot charcoal? $\text{Ca} = 40$.

4. How may phosphorus be procured from bones? If the weight of the human skeleton be taken as 25 pounds, and $\frac{3}{4}$ of that weight be tricalcic phosphate ($\text{Ca}_3 \text{P}_2 \text{O}_8$), calculate the amount of phosphorus which is contained in the human frame. $\text{Ca} = 40$.

5. Explain what is meant by the *basicity* of an acid.

6. How would you distinguish (1) between nitrous oxide and nitric oxide; (2) between hydrogen and marsh gas; (3) between hydrochloric acid gas and hydrobromic acid gas; (4) between carbon monoxide and carbon dioxide?

THE CLASS-ROOM.

DAVID BOYLE, Editor, Toronto.

NOTES ON FOURTH BOOK LESSONS FOR ENTRANCE EXAMINATION, JUNE, 1886.

BOADICEA.

Warrior-queen. Boadicea led her army in person.

The oak . . . the Druid. The Druids were the British priests, who were supposed to possess mystical powers of prophecy. The oak was considered sacred and mistletoe, cut

from it amid great solemnities by the Druids, was supposed to have a magic power over sickness.

Resentment . . . tongues. Our anger is too great for expression.

A thousand states. The definite number "a thousand" is placed for the indefinite "very many." Rome ruled the then known world.

The Gaul . . . gates. Rome suffered greatly from invasions by the Gauls.

Other Romans. The modern Italians, who have been famed for their music, but have had no distinction in war.

Armed with thunder, i.e., cannon.

Wings. Sails.

A wider world. The British Empire is larger than the Roman Empire ever was.

Cæsar. The name given to the Roman Emperors.

Thy posterity. As Boadicea was a British queen the *English* race can hardly be called her posterity, except for the fact that they inhabit her country.

His eagles. The Roman standard.

Died. Boadicea is said to have poisoned herself.

See note in the Reader for remarks on Cowper, also on Boadicea.

THE TRUANT.

He had dwelt . . . Eden. Labour has been the lot of man ever since the fall.

Ingenuous. Open, candid.

People say . . . more disagreeable. Alluding to the common supposition that manual labour is more severe than mental.

ARITHMETICAL PROBLEMS.

By Leo. B. Davidson, Head Master, Public School, Sault Ste. Marie.

1. Distinguish between

(a) Abstract and concrete numbers.

(b) Prime and composite numbers.

(c) Measure and multiple.

2. (a) The product of two numbers is 20,352, one-third of one of them is 64. Find the sum of the two numbers.