

CHEMISTRY.

Examiner—John Seath, B. A.

1. By what experiments and reasoning would you establish the law of multiple proportions?
2. Detail the experiments you could make with a piece of marble before pupils having no previous knowledge of Chemistry, stating in each case the conclusion you would expect them to draw.
3. Into separate test tubes containing dilute hydrochloric acid, are put zinc, zinc oxide, chalk, common salt, carbonate of ammonia, and charcoal. Fully describe and explain the effects produced.
4. A graduated bottle is given you, containing a mixture of hydrogen, oxygen, and ammonia. How would you find out the volume of each gas?
5. .3 gramme of a substance containing only C, H, and O, gave, on being burned, .5738 gramme of CO_2 and .3521 gramme of H_2O . Find its empirical formula.

PHYSICS.

Examiner—J. C. Glashan.

1. Describe the structure and action of the gridiron pendulum.
2. Explain clearly the difference between temperature and quantity of heat. What unit is generally adopted in measuring quantity of heat?
3. What is meant by the energy of a system and what by the principle of the conservation of energy? Define the mechanical equivalent of heat and find how many units of heat are required to raise a mass of 1000 tons to a height of 25 feet.
4. Explain why water looked into vertically downwards appears shallower than it really is.
5. Describe briefly the chief causes and remedies of short sightedness.
6. Describe the construction and mode of action of any form of galvanic battery.
7. Describe the construction and action of any form of dynamo-electric machine.

BOTANY.

Examiner—J. C. Glashan.

1. Name the essential and the more important non-essential elements of plant food and state the general function of each.
2. Describe the structure of a complete flower. Describe, mentioning examples, the modifications of the flower due respectively to cohesion, adhesion, and suppression of its various parts.
3. Give a brief morphological comparison of the leaf and the several parts of a complete flower.
4. Define a fruit and give the distinctive characters of at least four of the principal forms of fruits.
5. Give the chief characters and name three examples of
 - (a) The Crucifere.
 - (b) The Leguminosae.
 - (c) The Compositae.
 - (d) The Iridaceae.

HYGIENE.

Examiner—J. J. Tilley.

1. Give your views with reference to a properly constructed school house; considering location, heating, ventilation, admission of light.
2. Explain (a) how the blood gets its impurities in the tissues, (b) how the blood is purified in the lungs.
3. What do you mean by secretion? by excretion? Mention the chief secretory and excretory organs and state the function of each.
4. How would you treat a pupil suffering from
 - (a) Sun-stroke.
 - (b) Excessive bleeding at the nose.
 - (c) Fainting.
 - (d) Severing of an artery—a vein?
5. Give any process you know for testing the purity of drinking water.

CHESTERTVILLE PUBLIC SCHOOL.

MENTAL ARITHMETIC.

FIFTH CLASS.

Values 12½. Eight questions make a full paper.

1. What is the first time after 4 that the hands of a clock are equally distant from the figure IV?
 2. If the cost of an article had been 20 per cent. less, my gain would have been 40 per cent. more. What was the cost?
 3. (a) How much water must be mixed with 60 gallons of alcohol 66½ per cent. strong so as to form a mixture 50 per cent. strong?
(b) How must I mix sugar that cost me 5, 6, and 8 cents per pound so that I may have a mixture of 100 pounds, to be sold at 7 cents per pound, and neither gain or lose?
 4. If \$60 is the proper discount of \$360 for a certain time, what should the proper discount be off \$360 for half that time?
 5. A sum of money invested in the 3½ per cents. at 63 yields \$10 less income than the same sum invested in the 4½ per cent. at 68. Find the sum.
 6. How fast is a locomotive going when the small wheel, which is 4 feet in diameter, makes 120 revolutions per minute more than the drive wheel, which is 7 feet in diameter?
 7. A printer is hired at \$2.50 per day of 10 hours, and is to receive 40 cents an hour for overtime, and to be docked 12 cents an hour for lost time. He works on Monday 10½ hours; on Tuesday 8½ hours; on Wednesday 13 hours; on Thursday 11½ hours; on Friday 7 hours; on Saturday 4½ hours. How much is due him on Saturday night?—School Supplement.
 8. A grocer has 224 pounds of a mixture of chickory and coffee, the chickory being to the coffee as 1 : 6. What amount of chickory must be added to make the ratio 1 : 5? (Victoria Junior Matriculation.)
 9. A can row 1½ miles down stream and back again in 30 minutes. His rate of rowing in still water is three times that of the stream. Find his rate per hour, in still water.
 10. The thickness of a twenty-five cent piece is to that of a five cent piece as 7 : 5. Find the ratio of their diameters.
- Except 7 and 8 these examples have been selected from Ottawa Normal School exercises.

Practical.

REMARKS ON FITCH'S LECTURES ON TEACHING.

I.

This work has become the authorized text-book for Normal Schools in Ontario, and the recognized standard in the training of our teachers at Model Schools, Institutes, and Conventions. It has thus attained such a degree of prominence and authority as makes it imperatively necessary that the CANADA SCHOOL JOURNAL should subject it to careful examination with a view to ascertain its general character, to point out its strength and its weakness, and to show how far it ought to be allowed a controlling influence in our system of training teachers in the province of Ontario.

The origin of the book is clearly explained in the preface. Its general aim is to consider "the practical aspects of the school-master's work," and we are expressly cautioned that the "book is not, and does not profess to be, a manual of method." The author's main object is "to invite intending teachers to look in succession at each of the principal problems they will have to solve; to consider what subjects have to be taught, and what are the reasons for teaching them; and so by bringing together a few of the plainer results of experience to place readers in a position in which it will be a little easier for them to devise and work out method for themselves." Now, at the outset, we freely admit that the course of fifteen lectures here presented was highly appropriate for the University of Cambridge "experiment," the object of which was "to encourage among those who intended to adopt the profession of