

5. Obtain the logarithm of $\frac{1}{27}$ to base 243.
6. Solve the equations $x^2 - 2xy = 16$, $xy + y^2 = 3$.
7. How many permutations can be made by using all the letters of the word "examination," if the vowels do not occupy two consecutive places, that is, if they occupy the odd places only?
8. Two pipes working together fill a cistern in 2 hours, 40 minutes; if they worked separately, one would take 4 hours longer than the other. How long would each take?

CHEMISTRY.—XI.

3 to 5 p. m., Wednesday, 26 June, 1918.

(N. B.—Formulae are to be used only for a definite weight, not as a kind of short hand for the name of a substance; but when an action is described, give the equation if you can).

- Compare the combustion of iron and of wood. How could it be proved that in each case the products of the combustion weigh more than the original substance?
- Give the method of production of nitrous oxide; Or, of sulphur dioxide; Or, of hydrosulphuric acid; Or, of chlorine; Or, of ozone. What are the properties of the gas selected?
- Write what you can in the time allowed about methane; Or, graphite; Or, fertilizers.
- What are the characteristics of an acid? Name six acids. What are the characteristics of a base? Name one or two of the most common bases. What is meant by neutralization?
- Given these two equations:

$$\text{Ca}_3(\text{PO}_4)_2 + 3\text{SiO}_2 = 3\text{Ca Si O}_2 + \text{P}_2\text{O}_5$$

$$\text{P}_2\text{O}_5 + 5\text{C} = 5\text{CO} + 2\text{P}$$
 calculate how much phosphorus can be obtained from 620 pounds of calcium phosphate (Ca = 40; P = 31; O = 16; Si = 28; C = 12. These numbers are not all required; make use of the ones you need).
- Describe the properties of nickel; or, of silver; or, of zinc; and, if you can, how it is obtained from its ores.
- Why is baking powder used in cookery? Why is it not used in making bread?
- What are limestone, quick lime, slaked lime, milk of lime, and lime water? Tell enough about these to indicate the extent of your knowledge.

LATIN.—XI.

9 to 11 a. m., Thursday, 27 June, 1918.

- (a) Decline together, *aliud iter, pejus tempus, haec mulier*. (b) Assign present infinitives to the following supines, *coactum, cognitum, repulsum, datum, deditum, sensum, ruptum*. Also to the following participles: *secutus, passus, veritus, profectus, ortus, arbitratus*. Assign