

MISCELLANEOUS PROBLEMS SOLVED.

1. To solve the eqns.

$$\frac{ax + by}{cz} = \frac{cz + ax}{by} = \frac{by + cz}{ax} = x + y + z$$

$$\text{Each fract.} = \frac{(ax+by) + (cz+ax) + (by+cz)}{cz + by + ax} = 2$$

$$\therefore ax + by = 2cz, \quad cz + ax = 2by, \quad by + cz = 2ax$$

$$\text{whence } ax = by = cz \text{ and } x + y + z = 2$$

$$\text{whence } x + \frac{a}{b}x + \frac{a}{c}x = 2$$

$$\therefore x = \frac{2bc}{ab + bc + ca}$$

(2) A dog pursues a hare. The hare gets a start of 50 of her own leaps. The hare makes 6 leaps while the dog makes 5, and 7 of the dog's leaps are equal to 9 of the hares. How many leaps will the hare make before she is caught? (*Humblin Smith's Alg.*, p. 161.)

Let $6x =$ No. leaps made by hare.

$\therefore 5x =$ " " " " dog.

Let $9y =$ No. ft. in each leap of the dog.

$\therefore 7y =$ " " " " hare.

$\therefore 45xy =$ distance gone over by dog,

and $42xy =$ " " " " hare.

$\therefore 3xy = 50$ leaps of the hare, $= 350y$ ft.

$\therefore 3x = 350. \quad \therefore 6x = 700.$ —Ans.

(3.) The difference between the true and the bank discount on a note of \$5,300, payable in 9 months, is \$18. Find the rate per cent.

$$\text{Let } \frac{1}{x} = \text{rate of int. for 9 mos. } \therefore \frac{1}{x+1} =$$

rate of dis'c.

$$\begin{aligned} \text{Then } \frac{1}{x} - \frac{1}{x+1} &= \frac{1}{x} \cdot \frac{1}{x+1} = \frac{18}{5300} = \frac{36}{10600} \\ &= \frac{6}{100} \cdot \frac{6}{106} \cdot \frac{1}{x} = \frac{6}{100}, \therefore \frac{1}{x} = \frac{6}{100}, \\ &\therefore \text{rate per an.} = 8\% \end{aligned}$$

CHRISTMAS EXAMINATIONS, 1879.

CHEMISTRY, SIXTH FORM.

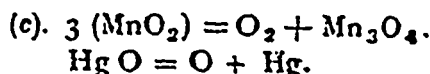
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I. (a). "Give best method for the preparation of O in the laboratory. (b). Give reasons for your answer. (c). Also indicate two other methods by equations."

(a). Heat Chlorate of Potash mixed with some Oxide of Manganese in a flask, and O will be given off. The Oxide of Manganese only facilitates the evolution of the O from the Chlorate of Potash; fine sand, etc., would have done as well; but if the O requires to be

absolutely pure, Chlorate of Potash alone must be used.

(b). This method is the best because it is the most convenient and economical.



II. (a). "Why is water hard? (b). What is the test for hard water? (c). How is Ca S O_4 detected in water, when in solution?"