

8. Solve the following equations:—

$$\left. \begin{aligned} \frac{bx}{a} - \frac{d}{c} &= \frac{a}{b} - \frac{cx}{d}; \text{ and} \\ \frac{x+y}{10} + \frac{x-y}{2} &= 0. \\ \frac{x+y}{5} + \frac{x-y}{2} &= 1. \end{aligned} \right\}$$

9. Out of 40 tons of goods a certain portion was sold, and there remained 8 tons more than was sold. The goods were bought at £5 15s. per ton, and the portion sold was sold at 20 per cent. profit. At what price per ton must the remainder be sold so that the seller may gain £48 on the whole transaction?

10. Find the value of x in the following equation:—

$$\frac{5}{8}x^2 - \frac{1}{2}x + \frac{3}{4} = 8 - \frac{2}{3}x - x^2 + 22\frac{3}{4}.$$

11. Three numbers are in continued proportion; the sum of the first and second is 10, and the third exceeds the second by 24: what are the numbers?

GEOMETRY.

1. Define postulates and axioms, and give two examples of each; also define an angle and a straight line.

2. Every parallelogram that has one of its angles a right angle has all its angles right angles.

3. If the square described upon one of the sides of a triangle be equal to the squares described upon the other two sides of it, the angle contained by these sides is a right angle.

4. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts shall be equal to the square on the other part.

5. If one circle touch another internally, they shall not have the same centre.

6. The straight line drawn at right angles to the diameter of a circle, from the extremity of it, falls without the circle; and no straight line can be drawn from the extremity between that straight line and the circumference so as not to cut the circle: or, which is the same thing, no straight line can make so great an acute angle with the diameter at its extremity, or so small an angle with the straight line which is at right angles to it, as not to cut the circle.

7. When the centre of a circle described about a triangle falls within the triangle it is an acute-angled triangle, when the centre falls in one side it is a right-angled triangle, and when the centre falls without the triangle it is an obtuse-angled triangle.

NATURAL PHILOSOPHY.

1. What is meant by specific heat and latent heat?

2. Explain compensating pendulums and balance-wheels.

3. How is sound caused? Describe the mechanism of the human ear.

4. Explain the cause of Fraunhofer's lines in the solar spectrum, and the theory of spectrum analysis.

5. Explain the different forms of the electric light.

CHEMISTRY.

1. Explain the action of chlorine as a bleaching agent.

2. Describe the mode of preparation of nitrous oxide, and give an account of its composition and properties.

3. Describe the compounds of arsenic with oxygen, and explain Marsh's test for arsenic.

4. What percentage of iron is there in ferric oxide?

5. Describe and give the formulæ of the compounds of phosphorus and hydrogen.

ZOOLOGY.

1. Describe the circulation of the blood and the respiratory apparatus in fishes and mammals.

2. Give examples of the different classes of the sub-kingdom Mollusca.

3. To which orders do whales, dugongs, seals, dolphins, manatees, walruses, respectively belong? Describe the distinguishing characters of these orders.

4. What are the classes of the sub-kingdom Articulata?

5. What is the geographical distribution of the Marsupialia?

HISTORY.

1. Describe the forms of trial of accused persons under the Saxons, Normans, and Plantagenets respectively.

2. Whence does the Privy Council derive its origin? What were its main duties when first formed, and what are they now?

3. There are two triple alliances and two quadruple alliances well known in English history. Between what countries and for what purposes were these entered into?

4. Mention the chief literary Englishmen during the Georgian period, with their best-known works.

5. Acts confirming and extending the privileges granted by Magna Charta have been passed. Name them, and state their provisions.

BOOK-KEEPING.

1. Rule out the usual form for a "Trial Balance-sheet," and explain its purpose.

2. On which side should the "Assets" be placed, and on which side the "Liabilities"? And what does the difference between the two totals represent?