Б A merchant sold an article at a certain per cent. profit; if the cost had been 15 per cent. less, his profit would have been 30 per cent. more. What was his gain per cent.?

6. A grocer mixed coffee at 28 cents a pound with some of a better kind at 42 cents pound, and by selling the mixture at 35 cents a pound he gained 15 per cent. on the former and 2.1 per cent. on the latter; in what proportion did he mix them?

Define the gram. and litre. In an English inch are contained 25 3995 millimeties. How many kilometres are there in a mile?

PRACTICAL MATHEMATICS.

1. Define Trigonometrical functions, circular functions, and show that cosine $60^\circ = \frac{1}{2}$, and deduce the remaining functional values.

2. Explain by means of a diagram the mode of computing the horizontal distance between two inaccessible points; distinguish between angle of depression and angle of elevation.

3. Demonstrate the rule for finding the area of a triangle when the three sides are given. The ratio of two sides of a triangle is 5 to 6, and the segments of the base made by a perpendicular falling from the vertical angle on the base are 10 and 14. Find the sides and area of the triangle.

4. Define Prism, right, oblique, and regular Prism, Pyramid. In a garden there is a grass plot in the form of a square, each side of which is twolve feet, in the centre of the plot a flag-pole rises to the height of 20 feet; how many yards of canvas will be necessary for a conical tent whose base shall enclose the grass plot and the apex of which shall be top of the pole?

5. Into a conical glass (full of water) whose slant height is 7 inches, and diameter across the top 6 inches, a sphere of iron is gently let fall, of such a size that the plane of the glass's edge is tangent to it; how much water will remain in the glass?

6. What is meant by the Centre of Gravity of a body? Where is the C of G. of three equal bodies situated at the angular points of a triangle; of four equal bodies at the corners of a parallelo-gram? A uniform circular disk has a circular hole punched out of it, extending from the circumference half way to the centre. Find the centre of gravity of the remainder.

ALGEBRA.

1. State and demonstrate the rule for the multiplication of fractions.

2 (a) Express in words the meaning of a and write the expression in another way. (b) Multiply $3^{-5} + 2ab$ by -2a - 3ab.

3. A banker has two kinds of change; there must be a pieces of the first to make a crown, and b pieces of the second to make the same; now a person wishes to have c pieces for a crown. How many pieces of each kind must the banker give him?

4. Find the values of x and y from the equations 5y+3

$$2y + -\frac{y}{r} = 1$$

$$x^{2} + 5x + y(y-1) = 24$$

5. "In a quadratic equation where the terms are all on one side, and the co-efficient of the square of the unknown quantity is unity, the sum of the roots is equal to ______, and the product of the roots is equal to _____ Complete the above statements and prove roots is equal to both.

6. Free from radicals the Equation

$$\frac{v^{x} + v_{x-a}}{v^{x-v} + v_{x-a}} = \frac{a^{y_{x-a}}}{v_{x-a}}$$

7. According to natural philosophy, a body falling in a vacuum describes in the first second of its fall 16 1-12 feet, and in each succeeding second 32 1-6 feet more than in the second immediately preceding. If a body has fallen 20 seconds, how many feet has it fallen in the last second, and how many in the whole time?

GEOMETRY.

1. Define accurately secant, tangent, chord, sector, normal, and show why algebraical proofs cannot always be substituted for geometrical in demonstrating propositions of the second book.

2. If a straight line be bisected and produced to any point, the square on the whole line thus produced and the square on the part of it produced are together double of the square on half the line bisected and of the square on the line made up of the half and the

part produced. 3. To describe a circle which shall pass through two given points on the same side of a given straight line, and touch that straight line.

4. The opposite angles of any quadrilateral figure, inscribed in a circle, are together equal to two right angles.

5. Show that the perimeter of an isoceles triangle is less than that of any triangle of equal area on the same base.

6. To inscribe a regular hexagon in a given circle.

7. Through a given point without a circle draw a chord such that the difference of the angles in the two segments, into which it divides the circle, may be equal to a given angle.

SCHOOL SYSTEM AND SCHOOL MANAGEMENT.

1. State the principles which regulate the apportionment of the County Fund to Trustees, and show in what respect they tend to secure (1) school privileges in a section and (2) a good attendance. 2. Discuss the nature and extent of the teacher's authority over

his scholars outside the school room.

3. Define Discipline, and specify some of the means by which you would seek to promote it.

4. What physiological reasons render necessary careful regulation of the school-room as regards (1) temperature, (2) cleanliness, (3) ventilation.

5. When is the annual school meeting held? What are its chief powers and duties ?

TEACHING.

1. Discuss the "educational value of memory," and state principles which should regulate the development and training of that faculty.

2. Give your method of explaining to a class of beginners sub-traction in Algebra.

3. Describe the teaching of any lesson in English Grammar that has specially impressed you, either favorably or unfavorably. Discuss with particular reference to effect on pupil's growth; (1) in knowledge, (2) in mental power.

4. Name and briefly describe the various methods of teaching beginners to read. Justify your own method.

5. Furnish the outlines of an oral lesson on any plant, mineral, or animal you choose.

PHYSIOLOGY.

1. What do you understand by the terms Life and Death? Distinguish between the different kinds of Death, and state what may be considered as the "immediate cause" of death to the individual.

2. Give a short description of the connections and structure of the beart.

3. State the disadvantages of a purely nitrogenous diet; show the economy and advantages of a mixed diet.

4. Demonstrate the existence of the muscular sense. Write a note on the sense of Touch (including that of heat and cold).

5. Discuss the properties of the following as articles of cloth-ing: Linen, Cotton, Woollen.

State the effects of "overtasking the emotions" upon mental 6. stability.

(Candidates are at liberty, as per Syllabus of Examination, to write on such two of the three subjects given below as they may choose. No credit will be given to papers on all subjects from the same candidate.)

CHEMISTRY.

1. Distinguish between Acids, Bases and Salts; what is the difference between an ate, an ite and an ide compound ?

2. Give the source, mode of preparation and properties of H. N. Explain the process of Combustion as in the burning of a 3.

candle. What is the Oxy-hydrogen blow-pipe? Give symbol and atomic weight of Silicon. What is the

composition of each of the varieties of glass? 5. Name the principal alloys. Give their constituents with the proportion of each metal used in the alloy.

6. Write a full note on the benefits of drainage to the land.

PHYSICS.

1. Give the general characteristics of each of the "three states of matter.

- 2. Detail experiments illustrating Mariette's or Boyle's Law.
- Define Physics, work, energy, potential and kinetic energy. S.

4. Explain the terms conduction and convection of heat, and name some of the familiar phenomena explained by the latter. What is distillation ? evaporation ? dew-point? Explain Б. fully.

6. Explain the process of electrotyping.

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