Examination Department

150TH EXAMINATION

ADVANCED ARITHMETIC

Monday, January 24, 1898—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more.** *If more than 10 are answered only the first 10 answers will be considered. Division of groups is not allowed. Give each step of solution, indicating the operations by appropriate signs. Use cancelation when possible. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 10 credits.*

1 Define *integer, decimal, partitive proportion, mensuration, bank discount.*

2 Change 364895 in the decimal scale to an equivalent number whose scale is 5.

3 Prove that any number divided by 11 will have a remainder equal to the sum of the digits in the odd places minus the sum of the digits in the even places.

4 Divide 71.85678 by 21.3456, using the contracted method and finding a result correct to *three* decimal places.

5 Reduce 3.142857 to a common fraction.

6 Give a brief account of the Gregorian calendar.

7 The longitude of Madrid is 3° 45′ west, that of Cairo is 31° 15′ east; when it is 11 a. m. at Madrid what time is it at Cairo?

8 A dealer invests $525 in coal, paying $3.50 a long ton; he sells the coal at $5 a short ton. Find his entire gain.

9–10 Find the cube root of 10, correct to *two* decimal places. Explain each step.

11 Two notes, each due in 3 years, the aggregate face value of which is $1000, are discounted, one at 4% bank discount, the other at 4% true discount; the sum of the proceeds of the two notes is $887.20. What is the face value of each?

12 A screen is equally illuminated by two lights, one of which stands 6 inches from the screen and the other 20 feet from the screen. If the first is 2 candle-power, of what candle-power is the second? (The intensity of light varies inversely as the square of the distance.)

13 A merchant buys 50 pieces of goods in Paris at 250 francs a piece, exchange being at 5.15; the duty is 50% of the price and the expenses of shipping are $75. For how much must he sell each piece to gain 25%?

14–15 A trench for the laying of a line of water-pipe 1 mile long is required to be 5 feet deep and 2 feet wide; the average depth of the earth excavation is 4½ feet, the remainder being rock; the cost of the pipe is 20 cents a foot, that of the exca-