High School Department

182D EXAMINATION

ADVANCED ARITHMETIC

Monday, June 13, 1904—9.15 a. m. to 12. 15 p. m., only

Answer eight questions but **no more.** *If more than eight are answered only the first eight answers will be considered. Give all operations (except mental ones) necessary to find results Reduce each result to its simplest form and mark it Ans. Each complete answer will receive* 12½ *credits. Papers entitled to 75 or more credits will be accepted.*

1 Give an explanation of the principle for fixing the decimal point in (*a*) multiplication, (*b*) division.

2 Test the divisibility of 29,172 by 4, 6, 8, 9, 11 without dividing it by them. State the principle applied in each test. Write as many of the prime factors of 29,172 as are determined by this test.

3 If $a\%$ is lost by selling an article for $\$B$, what per cent is gained by selling it for $\$C$?

4 The weight of the oil in a cylindric tank 2 meters in diameter and 3.5 meters in hight, is 8.47 metric tons (tonneaus); what is the specific gravity of the oil (the ratio of its weight to the weight of an equal volume of water)?

5 Prove that in all cases the square of a mixed number whose fractional part is $\frac{1}{2}$ is equal to $\frac{1}{4}$ plus the product of the integral part and a number 1 greater than the integral part.

6 Find the exact value of $.00\dot{2}47\dot{5} \div (\ 2\dot{7} \times .152\dot{7})$ and express the result both as a common fraction and as a circulating decimal.

7 A merchant buys 800 barrels of flour for $\$4400$ and lists it at $\$8$ a barrel, selling it at discounts of 10% and 10% from the list price; find his per cent of gain.

8 The entire surface of a cube is 121.5 square inches; find the volume and the diagonal of the cube.

9 Find the fourth term of the proportion $\sqrt[3]{5.832} : \sqrt{29\frac{1}{5}} :: \frac{1}{2} : x$

10 A man buys 40 shares of stock at $103\frac{1}{2}$ and sells it 8 months later at $101\frac{3}{8}$, meanwhile receiving a 4% dividend; find his gain or loss, money being worth 4% and brokerage being $\frac{1}{8}\%$.

11 The extremes of a geometric series are $1\frac{1}{2}$ and 384, the sum of the series is 511.5; find (*a*) the ratio, (*b*) the number of terms.

12 Find the number of years, months and days that $\$720$ must be at interest at 5% to amount to $\$814.90$.