185TH HIGH SCHOOL EXAMINATION

ADVANCED ARITHMETIC

Wednesday, March 29, 1905—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 Define repetend, continued fraction, cube root, consequent, arithmetic series.

2 If the same number is added to both terms of a fraction how is the value of the fraction affected when the fraction is (*a*) proper, (*b*) improper? Give proof of one case.

3 Find by division the greatest common divisor of 1859 and 2054. Give a demonstration of the process.

4 A grocer sold coffee, tea and sugar, receiving the same amount on each sale; on the coffee he gained 12%, on the tea 20% but lost 10% on the sugar. His total gain on the three sales was $82; find the selling price of each.

5 Write the continued fraction whose successive quotients are 2, 1, 3, 7. Change this continued fraction to an equivalent simple fraction.

6 A man invested $\frac{3}{8}$ of his money at $3\frac{1}{2}$%, $\frac{3}{32}$ at 4% and the rest at 6%; he wishes to put all his money into one investment that will not change the amount of his income. Find what per cent such an investment must pay.

7 A piece of work could have been done by 7 men in a certain time but 4 of the men were unable to work, so that the time was prolonged $5\frac{1}{4}$ days; find in what time the 7 men could have done the work. Write the analysis in full.

8 In a factory, men working $10\frac{1}{2}$ hours a day preferred to increase their time $1\frac{1}{2}$ hours a day, rather than to accept a reduction in wages; find to what per cent of reduction in wages this increase in time is equivalent.

9 A circular pond $46\frac{2}{3}$ feet in diameter is frozen to an average depth of $1\frac{4}{11}$ feet; find the number of tons of ice in the pond. [A cubic foot of water weighs $62\frac{1}{2}$ pounds. Specific gravity of ice=.9]

10 A body weighs 500 pounds on the surface of the earth; find how many pounds it would weigh 3000 miles (*a*) below the surface, (*b*) above the surface. [Assume the radius of the earth to be 4000 miles. Below the surface of the earth the weight of a body varies directly as its distance from the earth's center; above the surface the weight of a body varies inversely as the square of its distance from the earth's center.]

11 Find the cost of a draft on Albany for $5100, due 60 days after sight, if exchange is at 1¼% premium and money is worth 5%.

12 A captain of a ship when crossing the equator finds that the solar time is 28 minutes 36 seconds past 3 p. m.; by his chronometer, set at Greenwich, it is 34 minutes 50 seconds past 11 a. m. Find how many miles the ship is from the meridian of Greenwich. [At the equator $1^\circ = 69.16$ statute miles.]