Examination Department

142D EXAMINATION

ALGEBRA

Monday, January 25, 1897—9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

Answer the first five questions and five of the others but **no more**. *If more than five of these other questions are answered only the first five of these answers will be considered. Division of groups is not allowed. Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 20 credits.*

1 Define and illustrate *axiom, exponent, negative quantity, numeric equation, similar terms.*

2 Simplify $\frac{a^2-b^2}{a^2-2ab+b^2} \times \frac{a-b}{a^2+ab}$

3 Find the prime factors of $2a^2+ab-3b^2$, a^3+3a^2+3a+1, $a^4+2a^3+2a^2+2a+1$, $4x^3-9x$, $x^4+x^2y^2+y^4$

4 Solve $\frac{1}{x}+\frac{1}{y}=\frac{5}{6}$, $\frac{2}{x}-\frac{1}{y}=\frac{2}{3}$

5 The difference of the squares of two numbers is 81, and $\frac{2}{3}$ of the smaller is equal to $\frac{3}{4}$ of the larger; find the numbers.

6 Find the greatest common divisor (highest common factor) of $6x^4+x^3-x$ and $4x^3-6x^2-4x+3$

7 Find the least common multiple of y^3-3y+2 and y^3-1

8 Solve the following equation and state an axiom as authority for *each* of the three principal steps: $\frac{x}{2}+\frac{2x}{3}=2x-5$

9 Solve $x^2-\frac{x}{6}-\frac{1}{3}=0$

10–11 Solve $x^2+xy+4y^2=6$
$3x^2+8y^2=14$

12 Expand $(2a^2-3b^2)^3$ by the binomial theorem, writing all the computations for finding the coefficients.

13 Simplify each of the following: $\sqrt{75}$, $\sqrt[3]{81ab^3}$, $\sqrt{a} \times \sqrt[3]{b}$, $\frac{\sqrt{12}}{\sqrt[3]{16}}$, $\sqrt{a^2b^2-a^4b^2}$

14–15 A person expends $240 in the purchase of wheat; if he had paid 20 cents a bushel less he could have obtained 100 bushels more for the same money. How many bushels did he buy?