

University of the State of New York

Examination Department

135TH EXAMINATION

PLANE TRIGONOMETRY

Thursday, March 26, 1896—9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

Answer 10 questions but no more. If more than 10 questions are answered only the first 10 of these answers will be considered. Division of groups is not allowed.  $A$ ,  $B$  and  $C$  represent the angles of a triangle,  $a$ ,  $b$  and  $c$  the opposite sides and  $S$  the area. In a right triangle  $C$  represents the right angle and  $c$  the hypotenuse. Each complete answer will receive 10 credits.

- 1 Define cosine, cotangent, versed sine, quadrant, mantissa.
- 2 Compute the functions of  $A$  in a right triangle when  $b = \frac{1}{2}c$ .
- 3 Arrange in tabular form the algebraic signs of the sine, tangent and secant of an angle in each quadrant.
- 4 Construct  $A$  when  $\text{ctn } A = \frac{1}{2}$ .
- 5-6 Construct a right triangle that has  $\text{sine } A = \frac{2}{5}$  and  $b = 7$ .
- 7-8 Show how to solve a triangle when the three sides are given. Derive all the formulas necessary.
- 9 Name three pairs of functions such that the product of each pair shall equal 1; one pair, the sum of whose squares shall equal 1; two pairs, the difference of whose squares shall equal 1.
- 10 Derive the formulas for computing  $B$ ,  $a$  and  $c$  of a right triangle when  $A$  and  $b$  are given. Also find a formula that shall include only the required parts.
- 11 Prove that in any plane triangle  $a^2 = b^2 + c^2 - 2bc \cos A$ .
- 12-13 Derive the formulas for computing  $a$ ,  $c$ ,  $C$  and  $S$  of an oblique triangle when  $A$ ,  $B$  and  $b$  are given.
- 14-15 A tower stands on a hill. Show what measurements must be made on an adjoining plain and what formulas are necessary to compute the height of the tower; the distance from the observer to the top of the tower; the distance from the observer to a point in the plane of the observer directly under the tower.