Examination Department

146TH EXAMINATION

PLANE TRIGONOMETRY

Thursday, June 17, 1897—9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

Answer to questions but no more. If more than to 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, S the area. In a right triangle crepresents the right angle and c the hypotenuse. Each complete answer will receive 10 credits.

I Define secant, versed sine, negative angle, mantissa, co. logarithm.

2 Write a simple equivalent for each of the following: $\sin (180^{\circ} + A)$, $\tan (360^{\circ} - A)$, $\cos (270^{\circ} - A)$, $\sec (90^{\circ} + A)$, $\csc (180^{\circ} + A)$.

3 Construct each function of an arc in the third quadrant, writing the name and the algebraic sign of each.

4 State the conventional positive direction and the conventional negative direction of *each* of the following: sine, cosine, tangent, cotangent, secant.

5 Construct a right triangle in which csc $A = \frac{3}{2}$ and b = 10. Write the value of sin A, cos A, tan A.

6 Given sec $60^{\circ} = 2$; find the value of each of the other functions of 60° .

7-8 Find the sine and cosine of 30° and of 45° and from these values find the value of $\sin 15^{\circ}$ and of $\tan 15^{\circ}$. (15°= 45° - 30° .)

9-10 Demonstrate the following:

In any triangle a+b: $a-b=\tan \frac{1}{2}(A+B)$: $\tan \frac{1}{2}(A-B)$

determine whether there will be one solution, two solutions or no solution in each of the following cases: (a) $A < 90^{\circ}$, a > b, (b) $A < 90^{\circ}$, a = b, (c) $A < 90^{\circ}$, a < b, (d) $A > 90^{\circ}$, a > b, (e) $A > 90^{\circ}$, a = b.

12 Given a = 10 feet, b = 12 feet, c = 15 feet; find the value

of cos A and show how to complete the solution.

13 Given $\log a = 1.90309$, $\log b = 1.77815$, $\log \sin A = 9.97567$; find $\log \sin B$ and indicate how to find the remaining parts.

14-15 A person standing on a level plain at the base of a hill wishes to find the hight of a tower which is in full sight on the top of the hill; describe in detail the necessary measurements and computations.