Examination Department

142D EXAMINATION

PLANE TRIGONOMETRY

Thursday, January 28, 1897—9:15 a. m. to 12:15 p. m., only

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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. A, B and C represent the angles of a triangle, a, b and c the opposite sides, 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, logarithmic cosecant, angle of the third quadrant, negative angle, solution of a triangle.*

2 How many degrees are there in an angle represented by $\frac{1}{2}\pi$, $\frac{3}{4}\pi$, 2π, $\frac{3}{16}\pi$, $n\pi$?

3 Construct the negative functions of a negative arc in the third quadrant, and write the name of *each* negative function.

4 Find the value of the other functions of A when ctn $A=\frac{5}{13}$

5 If A is an acute angle, show that tan A is greater than sin A.

6 If sec $A=n$ tan A, what is the value of *each* of the functions of A?

7 Prove that any function of an angle is equal to the co-function of its complement.

8 If $2\cos A+\sec A=3$, what is the value of A?

9 Prove that $\cos(A+B)=\cos A\cos B-\sin A\sin B$.

10 Given log $2=.30$, log $3=.48$, log $5=.70$ and log $7=.85$; find the logarithms of 42, .056, 3.75, $3^{\frac{4}{3}}$, $2^{\frac{7}{18}}$

11 Given log cos $20°=9.97$ and log ctn $20°=10.44$; find *each* of the other logarithmic functions of 20°

12 Prove that in any plane triangle $b+c : b-c=\tan\frac{1}{2}(B+C) : \tan\frac{1}{2}(B-C)=\operatorname{ctn}\frac{1}{2}A : \tan\frac{1}{2}(B-C)$.

13 In an oblique triangle, given a, b and c; derive the formulas for computing A, B, C.

14 Prove that in an oblique triangle $2R=\dfrac{a}{\sin A}=\dfrac{b}{\sin B}$, R being the radius of the circumscribed circle.

15 A fort stands on a horizontal plain; the angle of depression measured from the top of the fort to a point P on the plain is $A°$, and to a point R, a feet beyond P, is $B°$. Derive the formulas for computing h, the hight of the fort, and d, the distance from P to the bottom of the fort.