High School Department

172D EXAMINATION

TRIGONOMETRY

Thursday, January 30, 1902—9.15 a. m. to 12.15 p. m., only

Answer eight questions but **no more.** *Include at least three from the third division if credit is desired for both plane and spheric trigonometry. If more than eight are answered only the first eight 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. In a right triangle C represents the right angle. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.*

Give special attention to arrangement of work.

First division

1 Perform the operations indicated in the following expressions, using logarithms where possible: $\overline{2.18}^6$, $\sqrt[5]{7776}$, $21\times18\times.05$, $\frac{45\times63}{14+13}$

2 The two legs of a right triangle are 5 feet and 12 feet respectively; express as common fractions the values of *six* functions of the smaller angle of the triangle.

3 Write the algebraic sign of each of *six* functions of *a*) an angle of 175°, *b*) an angle of 225°.

4 Assuming the values of sin $(A+B)$ and cos $(A+B)$; find the value of tan 2 A in terms of tan A.

Second division

5 Prove that in any plane triangle $\frac{c}{a+b}=\frac{a-b}{m-n}$, m and n being the segments of c made by a perpendicular from C.

6 In a right triangle $c=128$ feet, $A=37°\ 30'$; find B, a and b.

7–8 Given $b=75$, $c=64$, $C=27°\ 30'$; find *two* possible values for B and for a.

Third division

9 Write the four formulas known as Napier's analogies.

10 Given in a spheric triangle $a=174°\ 13'$, $b=94°\ 8'$, $c=90°$; find the three angles.

11 Given $a=52°\ 45'$, $b=71°\ 12'\ 40''$, $A=46°\ 22'$; find *two* possible values for B.

12 Prove that in any spheric triangle cos $A=\sin B \sin C \cos a-\cos B \cos C$.