High School Department

164TH EXAMINATION

SPHERIC TRIGONOMETRY

Tuesday, June 12, 1900 — 1.15 to 4.15 p. m., only

Answer 10 questions but no more. If more than 10 are answered only the first 10 answers will be considered. Division of groups is not allowed. In a spheric triangle A, B and C represent the angles and a, b and c the opposite sides. In a right triangle C represents the right angle and c the hypotenuse. Each complete answer will receive 10 credits. Papers entitled to 75 or more credits will be accepted.

1 In a right spheric triangle prove that $\sin A = \dfrac{\sin a}{\sin c}$, $\cos A = \dfrac{\tan b}{\tan c}$, $\tan A = \dfrac{\tan a}{\sin b}$

2–3 Assume $\cos A = \dfrac{\cos a - \cos b \cos c}{\sin b \sin c}$; derive the value of $\tan \frac{1}{2} A$.

4–5 Discuss the question of one solution, two solutions or no solution when there are given an oblique angle and the opposite side of a right spheric triangle.

6 Given B and a in a right spheric triangle; write the *three* logarithmic formulas which determine A, b and c respectively, and also the check formula.

7 Find the numeric values of A, b and c in question 6 when $B = 35° 30'$ and $a = 106° 40'$.

8–9 Find the distance in miles between San Francisco, latitude 37° 47′ north, longitude 122° 25′ west, and Honolulu, latitude 21° 18′ north, longitude 157° 50′ west. [Radius of earth = 3956 miles; 1° = 69.16 miles.]

10–11 In an oblique spheric triangle there are given $a = 42° 40'$, $b = 83° 20'$ and $A = 29° 30'$; find the remaining parts.

12–13 Given $c = 90°$, $a = 122° 53'$, and $b = 51° 5'$; find the remaining parts.

14–15 When the sun's declination is 12° 30′ north, at what hour will it rise at Albany, latitude 42° 39′ north?