New York State Education Department

209TH HIGH SCHOOL EXAMINATION

SOLID GEOMETRY

Monday, June 16, 1913—9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in solid geometry. Name the author of the textbook you have used in your study of solid geometry.

Answer seven questions, selecting three from group I and two from each of the other two groups.

Assign 12 credits to each question in group I and 16 credits to each question in groups II and III.

Group I

1 Prove that a straight line perpendicular to one of two parallel planes is perpendicular to the other also.

2 Prove that two similar tetrahedrons are to each other as the cubes of any two homologous edges.

3 Prove that the volume of a circular cone is equal to one third of the product of its base by its altitude.

4 Prove that the intersection of two spheric surfaces is the circumference of a circle whose plane is perpendicular to the line joining the centers of the spheres and whose center is in that line.

Group II

5 What is the locus of all straight lines which make a right angle with the line AB at the point B? State the proposition on which you base your answer.

6 Find a formula for the weight of a spheric shell, the inside radius being r, the thickness of the metal being t and the weight of a cubic unit of the metal being w.

7 Prove that the sum of the angles of a spheric triangle is greater than 180° and less than 540°.

Group III

8 Find the lateral area and the total area of a right prism whose altitude is 17 inches and whose base is an equilateral triangle with a side 5 inches.

9 On the same sphere there is an equilateral spheric triangle, each of whose angles is 93°, and a lune whose angle is 75°; find the ratio of the triangle to the lune.

10 When a body is placed under water in a right circular cylinder 12 feet in diameter, the level of the water rises 3 feet; find the volume of the body.