New York State Education Department

208TH HIGH SCHOOL EXAMINATION

SOLID GEOMETRY

Monday, January 20, 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 eight questions, selecting two from each group.

Group I

1 Prove that the sum of the face angles of any convex polyhedral angle is less than 360°.

2 Prove that if a straight line is perpendicular to a plane, every plane drawn through the line is perpendicular to the plane.

3 Prove that the volume of any prism is equal to the product of its base by its altitude.

Group II

4 Prove that if a pyramid is cut by a plane parallel to the base, the section is a polygon similar to the base.

5 Complete and prove: The lateral area of a frustum of a cone of revolution is equal to . . .

6 Prove that a spheric angle is measured by the arc of a great circle described from the vertex of the angle as a pole and included between the sides produced if necessary.

Group III

7 Prove that a perpendicular to a plane can be erected at a given point in the plane.

8 Prove that if a line is perpendicular to a plane, any plane parallel to the line is perpendicular to the plane.

9 Given a plane and a point P not in the plane; illustrate by a figure the locus of points lying in the given plane which are at a given distance from P. [Explain fully construction of figure. No proof required.]

Group IV

10 The circumference of the base of a right circular cone is 16π feet and its altitude is 10 feet; find the area of its lateral surface and its volume.

11 A piece of lead $5'' \times 3'' \times 6''$ is made into spheric balls each of which is $\frac{1}{4}''$ in diameter; find the number of balls.

12 On a sphere whose radius is 10 feet, find the area of a zone the radii of whose upper and lower bases are 6 feet and 8 feet respectively.