194TH HIGH SCHOOL EXAMINATION

SOLID GEOMETRY

Monday, January 27, 1908 — 9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group.

Group I 1 Prove that the sum of any two face angles of a triedral angle is greater than the third face angle.

2 Prove that the acute angle which a straight line makes with its projection upon a plane is the least angle which it makes with any line of the plane.

3 Prove that the volume of a triangular pyramid is equal to one third of the product of its base and altitude.

4 State and prove the formula for finding the area of a zone.

Group II 5 Find, in square feet, the area of a spheric triangle whose angles are 125°, 140°, 95°, the area of the surface of the sphere being 64 square feet.

6 A solid glass ball 6 inches in diameter is expanded by a glass blower till the glass is an inch thick; find the outer diameter of the hollow globe.

7 The diameter of the base of a right circular cone is 10.24 feet, its altitude is 18.3 feet; find the altitude of a right circular cylinder of equivalent volume, the diameter of whose base is 14.38 feet.

8 Find the number of square centimeters in the surface of a globe which is one decimeter in diameter.

Group III 9 Prove that if from any point in a diedral angle perpendiculars are drawn to the faces, the plane determined by these perpendiculars is perpendicular to the edge of the diedral angle.

10 Prove that the square of a diagonal of any rectangular solid is equal to the sum of the squares of its three dimensions.

11 A right triangle whose altitude is 4 inches and whose area is 6 square inches is revolved about its shortest side as an axis; find the volume of the solid generated.

12 Find the locus of points equidistant from two given points in space and also equidistant from two given parallel lines.