University of the State of New York

Examination Department

134TH EXAMINATION

SOLID GEOMETRY

Friday, January 31, 1896 — 1:15 to 4:15 p. m., **only**

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more**. *If more than 10 questions are answered only the first 10 of these answers will be considered. Division of groups is not allowed. Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically. Each complete answer will receive 10 credits.*

1 Define *diedral angle, pyramid, regular polyedron, right cone, sphere*

2–3 Prove that a line perpendicular to each of two lines of a plane at their intersection is perpendicular to the plane.

4 Prove that the sum of two face angles of a triedral angle is greater than the third angle.

5–6 Prove that if a pyramid is cut by a plane parallel to the base, (*a*) the edges and altitude are divided proportionally, (*b*) the section is a polygon similar to the base.

7 Prove that the transverse sections of a prism made by parallel planes are equal polygons.

8 Find an expression for the volume of a sphere inscribed in a cube whose edge is *a*.

9–10 Given the volume V and the hight h of a regular hexagonal prism, find *a*, one side of the base.

11–12 Find the surface and volume of the frustum of a pyramid whose lower base is 10 inches square, upper base 6 inches square and altitude 15 inches.

13 Write the formula for the convex surface of a cone; the convex surface of a cylinder; the surface of a sphere.

14–15 An equilateral triangle whose side is *a* revolves about one of its sides as an axis; find the surface and volume generated.