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University of the State of New York

Examination Department

131st examination

SOLID GEOMETRY

Friday, June 14, 1895—1 : 15 to 4 : 15 p. m., only

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 *surface of revolution, diedral angle, spheric segment, cylinder, frustum of a cone.*

2–3 Prove that the sum of the plane angles formed by the edges of any convex polyedral angle is less than four right angles.

4–5 Prove that if a pyramid is cut by a plane parallel to the base the section will be a polygon similar to the base.

6 State and prove the formula for the volume of a sphere.

7 State and prove the formula for the surface of a sphere.

8 A plane intersects a sphere in a circle whose diameter is 6 inches; the distance from the center of the sphere to the cutting plane is 6 inches. Find the diameter of the sphere.

9 Find the weight of an iron pipe 12 feet long, 1 inch thick, whose inner diameter is 10 inches. (Assume the specific gravity of iron to be 7.25.)

10 Show how to construct a line perpendicular to a given plane and passing through a given point outside the plane.

11 An isosceles triangle whose base is 4 inches and altitude 6 inches is revolved about its base; find (*a*) the volume generated, (*b*) the surface generated.

12–13 Find the dimensions of a cylindric half bushel measure whose altitude is half its diameter. (2150.4 cu. in.=one bushel.)

14–15 Find the diameter of a sphere which is circumscribed about a square pyramid whose base is 4 inches square and altitude 8 inches.