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*University of the State of New York*

# Examination Department

### 127th examination

## SOLID GEOMETRY

**Friday**, January 25, 1895—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 *regular polyedron, right cone, tangent plane, frustum of a pyramid, surface of revolution.*

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

4–5 Prove that two triangular pyramids having equal bases and equal altitudes are equal in volume.

6–7 State and demonstrate the formula for finding the volume of a sphere.

8–9 Find the weight of a spheric iron shell 1 inch thick whose outer diameter is 10 inches. (One cubic foot of iron weighs 487 lbs.)

10 Find the volume of the frustum of a pyramid whose lower base is 8 inches square, upper base 5 inches square and altitude 10 inches.

11 Find the volume of the cube which is inscribed in a sphere whose diameter is 4 feet.

12–13 A right cone the radius of whose base is $R$ and whose altitude is $h$ is divided into two equal parts by a plane parallel to the base ; find the entire area of the frustum formed.

14–15 A right pyramid whose base is 5 inches square is inscribed in a sphere whose radius is 1 foot ; find the volume of the pyramid.