University of the State of New York

Examination Department

138TH EXAMINATION

SOLID GEOMETRY

Friday, June 19, 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 *polyedral angle, oblique prism, regular polyedron, surface of revolution, segment of a sphere.*

2–3 Prove that two rectangular parallelopipeds having equal altitudes are to each other as their bases.

4 A lead ball, 3 inches in diameter, is recast into the form of a cylinder whose base is $1\frac{1}{2}$ inches in diameter. What is the altitude of the cylinder?

5 Prove that the lateral area of a regular pyramid is equal to one half the product of the slant hight by the perimeter of the base.

6 How many cubic meters of earth must be removed in order to construct a tunnel 100 meters long whose section is a semicircle with a radius of 3 meters?

7–8 Prove that the lateral area of the frustum of a cone of revolution is equal to one half the sum of the circumferences of its bases multiplied by the slant hight.

9 One edge of a cube equals a; find its surface, its volume and the length of a diagonal.

10 The volumes of two similar cones are 54 cubic feet and 432 cubic feet; the hight of the first is 6 feet. What is the hight of the other?

11–12 Prove that two triangular pyramids having equivalent bases and equal altitudes are equivalent.

13 Prove that every section of a sphere made by a plane is a circle.

14–15 Prove that the area of the surface of a sphere is equal to the product of its diameter by the circumference of a great circle.