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University of the State of New York

Examination Department

122d examination

SOLID GEOMETRY

Friday, June 15, 1894—1 : 15 to 4 : 15 p. m., only

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100 *credits, necessary to pass,* 75

Answer 10 questions but no more. *Division of groups is not allowed. If more than 10 questions are answered only the first 10 of these answers will be considered. 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, right cone, similar solids, surface of revolution, prism.*

2 Prove that two intersecting straight lines determine the position of a plane.

3 Prove that the straight line which is perpendicular to each of two lines at their point of intersection is perpendicular to the plane of those lines.

4 A section of a right circular cone is made by a plane parallel to the base of the cone. What is the section? Demonstrate.

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

6–7 State and demonstrate the theorem regarding the volume of the frustum of a triangular pyramid.

8–9 The three sides of a triangle are 6 feet, 8 feet and 10 feet respectively; find the volume of the solid generated by revolving this triangle about its longest side.

10 What is the relation which the volumes of any two rectangular parallelopipeds bear to each other? Demonstrate.

11 State and demonstrate the rule for finding the volume of any prism.

12–13 Find the weight of the water which will be contained in a vertical pipe 85 feet high and 1 foot in diameter. Find also the pressure per square inch at the base of the pipe. (The weight of one cubic foot of water=$62\frac{1}{2}$ lbs.)

14–15 In a cube whose edge is 1 foot there are inscribed a cylinder, a cone, a sphere and a square pyramid. Find the volume of each of these solids.