## University of the State of New York

## Examinations Department

79th examination

## SOLID GEOMETRY

Friday, Jan. 29, 1892-1:15 to 4:15 p.m., only

40 credits, necessary to pass, 30

Note.—Draw carefully and neatly each figure in construction or proof, using letters instead of numerals. Arrange work logically.

- 1. Define (a) plane; (b) diedral angle; (c) rectangular parallelopiped; (d) regular polyedron. 4
- 2. Mention four sets of conditions either of which determine the position of a plane.
- 3. Are two lines in space necessarily parallel to each other when each is parallel (a) to a given third line; (b) to a given plane? Give the reason for each answer.
- 4. Prove that if two planes are perpendicular to each other a straight line drawn in one of them perpendicular to their intersection is perpendicular to the other.
- 5. Prove that the sections of the lateral faces of a prism made by parallel planes are equal polygons.
- 6. Prove that a triangular prism may be divided into three triangular pyramids equal to each other in volume.
- 7. How many barrels of water in a well whose diameter is  $3\frac{1}{2}$  feet and the water 10 feet deep? (Assume  $4\frac{1}{5}$  cu. ft. = a barrel;  $\pi = 3\frac{1}{4}$ .) 4
- 8. The altitude of the frustum of a regular square pyramid is 16 feet, the lengths of the edges of the bases are 40 feet and 16 feet respectively. Find its volume.
- 9. If each edge of a cube is n, what, in terms of n, is the volume of (a) the inscribed cylinder; (b) the inscribed sphere; (c) the inscribed cone?