University of the State of New York

Examinations Department

107th examination

SOLID GEOMETRY

Friday, January 27, 1893—1:15 to 4:15 p. m., only

---

100 *credits, necessary to pass,* 75

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

1 Define and illustrate *angle of a line and plane, hexagonal prism, polyedron, great circle of a sphere.* 16

2 If each of two lines in space is perpendicular to a given third line are the two lines necessarily parallel? Can these two lines be perpendicular to each other? Explain each answer. 8

3 Prove that if two straight lines are intersected by three parallel planes the corresponding segments are proportional. 12

4 Prove that two rectangular parallelopipeds having equal bases are to each other as their altitudes. (Two cases.) 16

5 Prove that the lateral area of the frustum of a cone of revolution equals one half the sum of the circumferences of its bases multiplied by the slant hight. 12

6 A square pyramid 24 feet high has a base whose area is 400 square feet. Find (*a*) its lateral surface; (*b*) its volume; (*c*) the distance from the vertex to that section which is parallel to the base and has an area of 100 square feet. 12

7 What length of wire $\frac{1}{11}$ of an inch in diameter can be made from a cubic foot of brass? (Assume $\pi = 3\frac{1}{7}$.) 12

8 The radii of two spheres are *a* and *b* respectively; find the radius of the sphere equivalent to the sum of the two spheres. 12