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, polyhedron, great circle of a sphere.

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.

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

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

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 height.

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.

7. What length of wire \( \frac{1}{4} \) of an inch in diameter can be made from a cubic foot of brass? (Assume \( \pi = 3 \frac{1}{2} \).)

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.