151

The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

SOLID GEOMETRY

Monday, September 17, 1923—1.15 to 4.15 p. m., only

Answer eight questions, including not more than four from group I. Papers entitled to less than 75 credits will not be accepted.

Group I

Do not answer more than four questions from this group.

1 Prove that if each of two intersecting planes is perpendicular to a third plane, their intersection is also perpendicular to that plane.

2 Complete and prove the following theorem: The volume of any pyramid is equal to . . .

3 Prove that the sum of the angles of a spheric triangle is greater than two and less than six right angles.

4 Prove that if a line is perpendicular to each of two other lines at their point of intersection, it is perpendicular to the plane of the two lines.

5 The volumes of similar cylinders of revolution are to each other as the cubes of the altitudes, or as the cubes of the radii of the bases.

Group II

Irrational results may be left in the form of π and radicals unless otherwise stated.

6 Prove that any section of a regular square pyramid made by a plane through the axis is an isosceles triangle.

7 The area of the base of a right circular cone is 49π square inches and its altitude is 12 inches. Find the lateral area of the cone formed by passing a plane parallel to the base and 8 inches from the vertex.

8 What is the locus of points 2 inches from a given line AB and at the same time equidistant from the points A and B?

9 Prove that if a line is parallel to a plane, any other plane perpendicular to the line is perpendicular to the given plane.

10 Find the number of square inches in a spheric triangle whose angles are 120°, 100° and 85°, if the volume of the sphere is 288π cubic inches.

11 Prove that the square of a diagonal of a rectangular parallelepiped is equal to the sum of the squares of the three dimensions.