

Examination Department

154TH EXAMINATION

SOLID GEOMETRY

Friday, June 17, 1898—1:15 to 4:15 p. m., only

100 credits, necessary to pass, 75

Answer 10 questions but no more. If more than 10 are answered only the first 10 answers will be considered. Division of groups is not allowed. 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 *polyedral angle*, *polyedron*, *frustum of cone*, *parallelepiped*, *prism*.

2 Prove that the intersection of two planes is a straight line.

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

4 Prove that if two angles have their sides respectively parallel and extending in the same direction from their vertices the angles are equal and their planes are parallel.

5 Prove that the sum of any two plane angles of a triedral angle is greater than the third.

6 Mention the *five* regular polyedra and prove that there can be no others.

7 To what is the volume of a sphere equal? Prove.

8 To what is the surface of the frustum of a cone equal? Prove.

9 Find the area of a regular triangular pyramid each of whose edges is a .

10 A sheet of tin 20 inches by 12 inches is used for the curved surface of a cylindric vessel; find (a) the smallest square from which the bottom can be cut, (b) the cubic contents of the vessel.

11 A right triangle having its hypotenuse 5 and one leg 3 revolves about the other leg as an axis; find the area of the surface generated, including the base.

12 A square pyramid whose slant height is 26 inches is cut by a plane half way between the vertex and the base; the area of the section is 100 square inches. Find the volume of the frustum of the pyramid.

13 Find the cost, at \$2 a square foot, of gilding a hemispheric dome whose diameter is 40 feet.

14-15 A right triangle whose base is b and altitude a revolves about an axis in its own plane parallel to a and at a distance of r from it; find the volume of the solid generated.