New York State Education Department

207TH HIGH SCHOOL EXAMINATION

SOLID GEOMETRY

Monday, June 17, 1912—9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in solid geometry. The minimum time requirement is two recitations a week for a school year or four recitations a week for half a school year.

Answer eight questions, selecting two from each group.

Group I

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

2 Prove that a plane passed through two diagonally opposite edges of a parallelepiped divides the parallelepiped into two equivalent triangular prisms.

3 State and prove the theorem concerning the volume of a circular cylinder.

Group II

4 Prove that a section of a circular cone made by a plane parallel to the base is a circle.

5 Prove that in two polar triangles each angle of the one is the supplement of the opposite side in the other.

6 Prove that a plane tangent to a sphere is perpendicular to the radius drawn to the point of contact.

Group III

7 An open cistern is 4′ 6″ long, 2′ 8″ wide and contains 42 cu. ft; how many square feet of tin will be required to line it?

8 A regular hexagon whose side is R revolves about a diagonal as an axis; find in terms of R the entire surface generated.

9 In each of two right circular cones the diameter of the base is equal to the hight; what is the ratio of the hights if the volumes of the cones are 3:4?

Group IV

10 The altitude of the frustum of a regular square pyramid is 12 in. and the areas of the bases are 64 sq. in. and 16 sq. in. respectively; find the slant hight of the frustum.

11 The entire surface of a cube is 1014 sq. ft; find the volume of the cube and the length of one diagonal.

12 Find the ratio of the area of an equilateral spheric triangle, each of whose angles is 86°, to the area of a lune of the same sphere whose angle is 70°.