

University of the State of New York
Examination Department

118th examination

SOLID GEOMETRY

Friday, January 26, 1894—1:15 to 4:15 p. m., only

100 credits, necessary to pass, 75

Answer any 10 questions but no more. If more than 10 questions are answered only the first 10 of these answers will be considered. 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 *diedral angle, prism, frustum of a pyramid, cone of revolution, regular polyedron.*

2-4 Prove that if two angles, not in the same plane, have their sides respectively parallel and lying in the same direction they are equal, and their planes are parallel.

Find the number of cubic yards of stone required to build a dam 900 feet long, 21 feet high, 10 feet wide at the bottom and 4 feet wide at the top.

5-6 The base of a right prism is a square each of whose sides is a feet long, the hight of the prism being b feet. Find the volume (a) of the largest inscribed cylinder; (b) of the largest inscribed cone; (c) of the largest inscribed sphere.

7-9 Prove that the sum of any two face angles of a triedral angle is greater than the third face angle.

If a bucket is 16 inches deep, its upper diameter 18 inches and its lower diameter 12 inches, how many gallons of water will it hold? (231 cubic inches = 1 gallon.)

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

11 A rectangular sheet of tin 44 inches long and 14 inches wide is bent so as to form a cylindric surface 14 inches high. Find the volume inclosed.

12 Prove that the volume of a triangular pyramid equals one third the product of its base and altitude.

13 How many square feet of sheet lead will be required to line a cistern 4 feet long, 3 feet wide, containing 24 cubic feet, the cistern being open at the top?

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

15 Find the lateral surface and the volume of the frustum of a right square pyramid, the sides of its bases being 14 inches and 4 inches respectively, and the altitude 12 inches.