Answer eight questions. Irrational results may be left in the form of $\pi$ and radicals unless otherwise stated. Papers entitled to less than 75 credits will not be accepted.

1. Prove that the acute angle which a straight line makes with its own projection upon a plane not perpendicular to the given line is the least angle it makes with any line of that plane.

2. Prove that the lateral area of a prism is equal to the product of a lateral edge and the perimeter of a right section of the prism.

3. Prove that the sum of the sides of a convex spherical polygon is less than the circumference of a great circle.

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.

5. Find the volume of the frustum of a regular quadrangular pyramid the sides of whose bases are 8" and 14" respectively and whose slant height is 10".

6. Find the locus of the centers of all the spheres that can be passed through two given points.

7. Prove that the plane determined by the edge $VA$ of the tetrahedron $V' - ABC$ and $D$, the midpoint of the edge $BC$, divides the tetrahedron into two equal (equivalent) tetrahedrons.

8. The sides of a spheric triangle are $60^\circ$, $72^\circ$ and $102^\circ$ respectively; find in square inches the area of the polar triangle if the radius of the sphere is 8 inches.

9. Prove that if a line is parallel to one plane and perpendicular to another, the two planes are perpendicular to each other.

10. Find the ratio of the lateral areas of a right circular cone and a right circular cylinder having the same base and altitude, if the length of the radius is $\frac{3}{4}$ of the altitude.