Chapter III—Formulæ of reduction; easy examples only with explanatory notes. Omit § 63-7; 71 to the end of the chapter.

Chapter IV—Rationalisation, § 77 and read over § 78.

Chapter VI—Integration as summation; more elementary proof of § 90. Omit § 92 to the end of the chapter.

Chapter VII—Areas, § 126-131. Read over § 132-4. Polar Areas § 135. Omit §136-147. Areas by approximation § 148. Omit §149. Asymptotic areas of rectangular hyperbola; hyperbolic logarithms.

Chapter VIII—Arcs § 150-152, 155, 156, 167.

Chapter IX—Volumes and surfaces § 168-175; 178; 181.

Chapter X—Moments of Inertia. Special attention to § 196-8. Read over § 207-12. Omit § 212 to the end.................................*Marks—December*, 500.

Section *O.*—*Analytical Geometry of three dimensions* (*by lecture or notes to be printed.*) Equations of a point in space. Distance between two points. Projections of a straight line proportional to the direction cosines. $cos^2 \alpha + cos^2 \beta + cos^2 \gamma = 1$. Equations to a straight line. To find the inclinations from the equation. Angle between two given straight lines. Equation to a surface; condition of parallelism to one or two axes of co-ordinates. General equations to a sphere, ellipsoid, spheroid, and cone with principal axes parallel to the axes of co-ordinates. Definition of a plane (1) as described by a straight line moving parallel to one given straight line, and always intersecting another given straight line; (2) as the locus of a point equidistant from two given points. Equation to plane found from each definition in terms; 1st, of the inclinations of its traces and intercept on the axis of Z; 2nd, of the three intercepts on the axes; 3rd, of the perpendicular from the origin and its direction cosines. A line in space (or line of double curvature) as the intersection of two surfaces, usually two projecting cylindrical surfaces; particular case, a straight line. Length of the perpendicular from a given point on a given plane. Tangent to a curve; normal plane. Tangent plane to a surface; normal to a surface..*Marks—December*, 200.

N. B.—The preference is given, throughout the course, to symmetrical equations.

Section *P.*—*Statics and applications to Stresses.* (*Todhunter's Mechanics for beginners.*) Harder examples and the omitted articles in the 3rd Class obligatory course. Alternative proof of § 155. Omit § 154; 156 to 158.

(*Lectures or Notes to be printed.*) Resolution and Composition—1st, of forces in space; 2nd of couples. The six equations of equilibrium (*following the notation in Todhunter's Analytical Statics.*) Any system of forces reducible to two forces. Condition that there should be a single resultant. Equilibrium of a particle constrained to move; 1st, on a smooth curve; 2nd, on a smooth surface. Centre of parallel forces. Culman's graphical method. Alteration of the centre of gravity by transposition of a part of the body. Elementary methods of finding the centre of gravity of a circular arc, sector and segment. Centre of gravity of a small arc or segment respectively $\frac{2}{3}$ and $\frac{2}{5}$ of the distance from the chord to the arc. General formulæ for centre of gravity of area, arc, volume and surface of revolution. Guldin's Theorems. Attraction of a straight bar on a particle (1) in the direction of its length; (2) in any given position. Attraction of a circular lamina on a particle in a perpendicular axis through the centre. Principle of Virtual Velocities. Proof in the cases (1) of any system of forces on a particle, whether free or restricted to a smooth curve or surface; (2) of a pair of particles connected by an inextensible rod or line; also of any number of particles similarly connected, that is, a rigid body; (3) when any pair are connected by an inextensible string round a fixed point or pulley or round a point which is one of the parts of the system. Converse of this principle. Applications of the principle of Virtual Velocities. If any system of particles be in equilibrium under the action of gravity, their centre of gravity is (generally) in a highest or lowest position; in the former position the equilibrium is unstable, in the latter stable. Condition for stability of a heavy curved body resting on a horizontal plane;