

SYLLABUS OF MATHEMATICS—3RD CLASS—(OBLIGATORY) TOTAL, 2000 MARKS.

Euclid (Todhunter)—Definitions of Book V. explained Algebraically. Book VI. omitting props. XXVII, to XXIX, and first proof of XXX.....Marks, Dec. 100; June, 300.

Algebra (Todhunter's, for beginners, and printed notes)—4th Class course, particularly Factors, Quadratics, Proportion, Variation, Series, and applications to Problems. Marks—April, 50; June, 300.

Plane Trigonometry (Todhunter's, and lectures or notes to be printed)—Heights and distances, Chapter XV. § 239—241. Properties of triangles, Chapter XVI., omitting § 253, 4. Inverse ratios without examples, Chapter XVIII. § 263, December

Mensuration (lectures or notes to be printed)—Construction of ratios as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, $\frac{1}{\sqrt{7}}$, $\frac{\sqrt{3}}{2}$, $\sqrt{\frac{2}{3}}$, $\sin^2\theta$, $\tan^2\theta$, $\cot\frac{\pi}{8}$, &c., and combinations of these. Rectilinear and circular areas and perimeters and combinations of these. Area of ellipse as the projection of a circle. Area of a parabola intercepted by any chord, proved geometrically, polygonal approximation to the areas of curves. Simpson's rule. Summation of shot piles. December

Marks (Trigonometry and Mensuration).....December, 100; June, 400.

Conics and Analytical Geometry (lectures or notes to be printed)—Rectilinear and polar co-ordinates. Distance between two points. Area of triangle. Equation to a line. Equation of the 1st degree. Principle of intersections. Equation to a circle (any rectangular axes). Intersections with a straight line, three cases. General definition (Todhunter's) of a parabola, ellipse, hyperbola. Sections of a right cone shewing foci and directrices. Equation to parabola; construction of any point on a parabola by drawing a tangent. Equality of inclinations of tangent to axis and radius vector. Sub-tangent bisected by the curve. Tangents meeting on the axis. Definition of diameter as the bisector of chords parallel to the tangent at its extremity. Geometrical proofs that any straight line parallel to the axis is a diameter, that the tangents at the extremity of any chord meet on the diameter which bisects it, and that the portion of diameter thus intercepted is bisected by the curve. Geometrical proof of equation referred to diameter and tangent. The distance of any external point from the parabola measured parallel to the axis varies as the distance along the tangent. Ellipse defined as the projection of a circle, as described by the trammel and as the locus of $r + r' = 2a$. Equation proved from the two former definitions. Geometrical proof from the latter definition that the tangent is equally inclined to the focal distances. Locus of the foot of the perpendicular from focus on tangent. Statement of the lengths ae , a , $\frac{a}{e}$. Conjugate diameters as the projections of perpendicular diameters of the auxiliary circle. $a'^2 + b'^2 = a^2 + b^2$ and the circumscribing parallelogram = $4ab$. Equation referred to conjugate diameters without proof. Hyperbola compared with the ellipse without proof. Asymptotes. Conjugate hyperbola. Conjugate diameters. Equation referred to the asymptotes without proof. Rectangular hyperbola. Similarity of curves; Newton's definition. Meaning of constants of position and constants of size and shape. Similarity of all circles and parabolas. Dissimilarity of ellipses and hyperbolas; similarity if $\frac{b}{a}$ is constant. Application of the test of magnifying.

Marks—April, 200.

Statics.—(Todhunter's Mechanics for beginners.)

Chapter I, II,—Omitting proof of parallelogram of forces § 45 to end of Chapter. Chapter III, IV, V,—Omitting § 78 to end.

Explanatory notes in lieu of Chapter VI, on the equilibrium of a body and the method of working examples. Constrained body and principle of the lever.