

found from each definition in terms; 1st, of the inclination 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. Length of a perpendicular from a given point on a given plane. Tangent to a curve; normal plane. Tangent plane to a surface; normal to a surface; Properties of radii of curvature of two perpendicular normal sections of a surface (without proof; section of spheroid, normal to a meridian.

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

Marks—December, 200.

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 $\frac{1}{3}$ 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. Attraction of a cone on its vertex; of a thin spherical shell on an internal particle; of a homogeneous sphere on an external or internal particle. 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 p
tions
partic
centr
tion;
latter
restin
surfac
smoot
equilib
given
at the
curve;
three
the sus
nary;
larity t
of a he
rods of
of equa
the poi
angle o
the mor

Dyn
question
impact,
over onl
XIV, XV
Note
to rectili
(2) vary
square of
the attrac
heavy ch
with part
cally on a
the veloci
of resistan
motion, th
tions of r
tangential
Viva. Eq
influence o