of pressures over a plane rectangular joint with application to reservoir walls; the two conditions for stability. Moments of Inertia of a square, rectangle, circle, ellipse, equilateral triangle, regular polygon and other figures, also of a sphere; of a lamina about a perpendicular axis. Proof and explanation of $I = M (h^2 + k^2)$. Radius of gyration. Application of the calculus to determine the whole pressure on a surface and the centre of pressure on a plane surface. Proof that the centre of pressure is generally below the centre of gravity. Metacentre; determination of height above the centre of flotation, condition for stability. Application to the flotation of simple solids. The various positions of stability of a square log of timber as its specific gravity varies from nothing to 1.

Law of pressure of gases. Fluids with densities varying according to different laws. Barometrical measurements of heights. Proof of $z = 26215 \, log \, \dfrac{H}{h} = 262\text{'}5. \, \dfrac{H - h}{h}$, approx.

$z = 52430 \, \dfrac{H - h}{H + h}$. Height of the "homogeneous atmosphere."

Stress on boilers and thin metal cylinders. Thin hollow sphere. Relation between pressure on a surface and the tensions in the directions of principal curvature. Thick hollow cylinder $t = \dfrac{R^2 + r^2}{k^2 - r^2}$ Resistance of tubes to collapsing under external fluid pressure.

Flow of water through pipes. Torricelli's Theorem. Vena contracta. Fluid friction independent of the pressure, proportional to the wet surface and to the square of the velocity. Calculation of the sizes of water pipes. Open channels.

Marks—June, $\begin{cases} A. 150. \\ B. 250 \end{cases}$

Notes on Voluntary Course,

1st CLASS.

Voluntary—1,500 Marks.

MATHEMATICS AND MECHANICS.

N.B.—*Only Section V and so many of the others as make a total of 1,500 may be taken up.*

Section S.

Algebra and Trigonometry. Re-examination on the former course, (Sections C, G, H). Probabilities (*Todhunter*.)