LECTURE XLVIII.

- (a) Construction of convex lens.
- (b) Cardinal Points and Cardinal Rays. Rays parallel to axis are converged to pass through *Principal Focus*. Rays directed towards *Optical Centre* are not deviated.
 - Optical diagrams for typical cases and paths of rays to eye placed to view the images.
- (c) Focal length. Power; the dioptre.
- (d) Numerical relations between object and image distances and dimensions.

Let u = object distance, v = image distance, m = magnification, f = focal length. Sign convention. Case (1) object moving from u = 0 to u = f

Case (2) object moving (a) from u = f to u = 2fand (b) from u = 2f to u = infinity.

Case 2. Case 1. Real Virtual Class Inverted Attitude Erect Magnification (m) increases 1 to infinity (a) decreases infinity to 1 (b) decreases 1 to 0 Image distance (v) increases 0 to infinity (a) decreases infinity to $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \qquad (b) \text{ decreases } 2f \text{ to } f$ $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ Formula

- (e) Other image-forming optical systems. Optical diagrams should be worked out for each of these.
 - (1) Plane mirror.
 - (2) Plane refracting surface. Image distance from surface divided by object distance equals index of refraction from first medium to second medium.
 - (3) Converging lens system.
 - (4) Diverging lens.
 - (5) Concave and convex mirrors.

LECTURE XLIX.

OPTICAL INSTRUMENTS.

- 1. The Artificial Horizon, the Sextant, the Total Reflection Prism.
- 2. The Eye. The optical system consists of (a) the cornea, (b)aqueous humour, (c) crystalline lens, (d) vitreous humour, (e) retina. Whole system constitutes a converging lens system, which forms real image on retina. Accommodation for different object distances accomplished by altering power of system. Illustrate. Nearest normal distance of distinct vision is 25 cm. or 10 ins.

Long and short sighted eyes. Remedy. Cardinal points of eye; focus, nodal point.

3. The Magnifying Glass.