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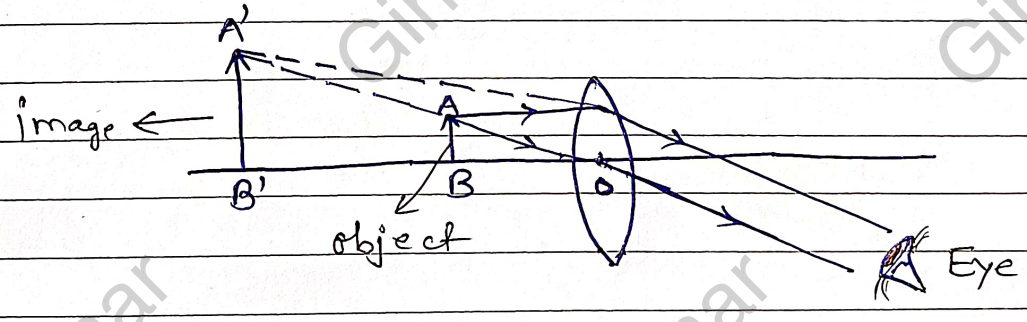
* Unit - (3) Microscopes Paper - (7)

A microscope is an optical instrument used for obtaining magnified images of very small objects. The magnified image is obtained with the help of a conver lens or a pair of conver lenses. We simply get an opportunity to work with two types of microscopes —

(1.) Simple microscope.
(2.) Compound microscope.

(1.) Simple microscope.

A simple microscope is a commonly used magnifying glass. We know that if an object is located at a distance less than the focal length of the conver lens, it produces an erect, virtual and magnified image.



The magnifying power of a simple microscope is given by the relation.

$$M = 1 + \frac{D}{f}$$

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Where D is the normal distance of distinct vision and f is the focal length of the converging lens. A typical magnifying glass has magnification of the order of 25.

The magnifying power of a simple microscopes will be greater if a lens of smaller focal length is used. But magnification can not be increased beyond a certain value. This is because serious distortions in the image are introduced when the lens is of very small focal length.

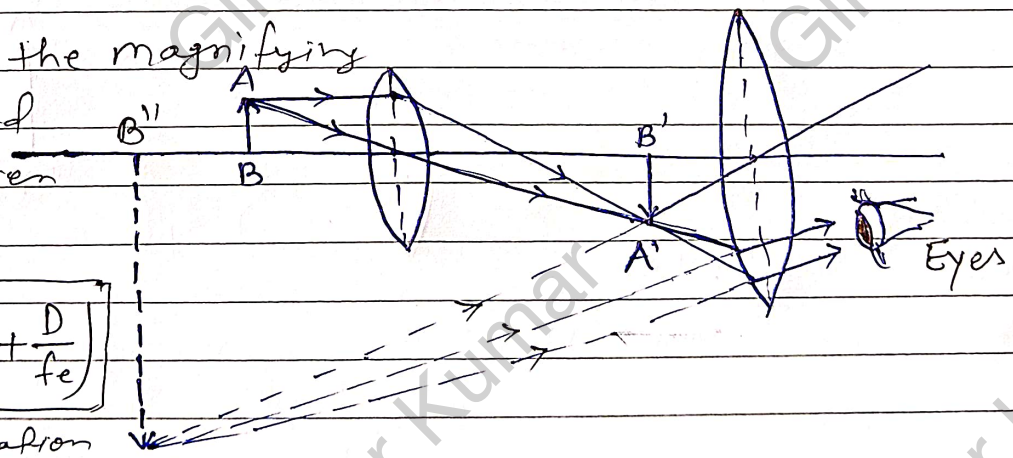
(2.) Compound microscope

A compound microscope is more frequently used in the Life Sciences laboratory. In a physics laboratory, it is used to determine young's modulus by bending of beams, the diameter of a capillary and frings width in Newton's rings experiment.

Mathematically, the magnifying power of a compond microscope is given by —

$$M = m_o \times m_e \frac{v_1}{u_1}\left(1 + \frac{D}{f_e}\right)$$

Where m_e is the magnification of the eyepiece and m_o is the magnification of the objective



(Ray diagram of Compound Microscope)

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