Answer on Question #41823, Physics, Optics

Find the position and magnification, m, of the image formed by a concave mirror of focal length 24 cm when an object is placed 40 cm from the mirror given that m is V/U

Solution:

Given:

$u = 40\ cm,$

$f = 24\ cm,$
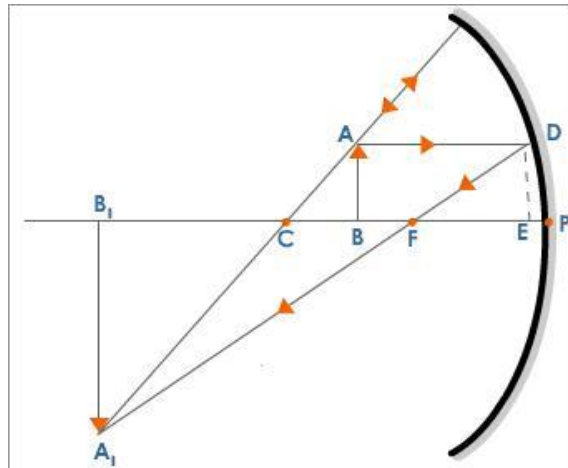
$v =?$

$m =?,$

Mirror formula is the relationship between object distance (u), image distance (v) and focal length.

The mirror formula for a concave mirror is

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

Thus,

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$\frac{1}{v} = \frac{1}{24} - \frac{1}{40} = \frac{1}{60}$$

$$v = 60\ cm$$

The magnification of the lens is given by:

$$m = -\frac{v}{u}$$

$$m = -\frac{60}{40} = -1.5$$

A negative sign in the value of the magnification indicates that the image is real.

Answer. position of the image $v = 60\ cm,$ magnification $m = -1.5$