1. An ellipse is drawn by taking a diameter of the circle $(x-1)^2 + y^2 = 1$ as its semi-minor axis and a diameter of the circle $x^2 + (y-2)^2 = 4$ is semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is : **[2012]**

(a) $4x^2 + y^2 = 4$

(b) $x^2 + 4y^2 = 8$

(c) $4x^2 + y^2 = 8$

(d) $x^2 + 4y^2 = 16$

Solution: -

1. **(d)** Equation of circle is $(x-1)^2 + y^2 = 1$

$\Rightarrow$ radius $= 1$ and diameter $= 2$

$\therefore$ Length of semi-minor axis is 2.

Equation of circle is $x^2 + (y-2)^2 = 4 = (2)^2$

$\Rightarrow$ radius $= 2$ and diameter $= 4$

$\therefore$ Length of semi major axis is 4

We know, equation of ellipse is given by

$$\frac{x^2}{(\text{Major axis})^2} + \frac{y^2}{(\text{Minor axis})^2} = 1$$

$$\Rightarrow \frac{x^2}{(4)^2} + \frac{y^2}{(2)^2} = 1 \Rightarrow \frac{x^2}{16} + \frac{y^2}{4} = 1 \Rightarrow x^2 + 4y^2 = 16$$