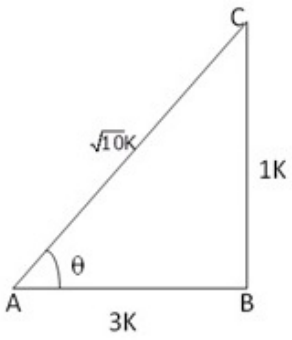
Question 5

Given: $cosec\theta = \frac{AC}{BC} = \frac{\sqrt{10}}{1}$

Let AB = $\sqrt{10}$k and AC = 1k,

Where k is positive

Let us draw a ΔABC in which ∠B = 90^0 and ∠BAC = θ



By Pythagoras theorem, we have

$$(AC)^2 = (AB)^2 + (BC)^2 \Rightarrow (AB)^2 = (AC)^2 - (BC)^2$$

$$= \left[\left(\sqrt{10}k\right)^2 - (k)^2\right] = \left(10k^2 - 1k^2\right)$$

$$\Rightarrow (AB)^2 = 9k^2$$

$$\Rightarrow AB = \sqrt{9k^2} = 3k$$

$$\therefore \sin\theta = \frac{BC}{AC} = \frac{1}{\sqrt{10}}$$

$$\cos\theta = \frac{AB}{AC} = \frac{3k}{\sqrt{10}k} = \frac{3}{\sqrt{10}}$$

$$\operatorname{cosec}\theta = \sqrt{10}\,(\text{given})$$

$$\sec\theta = \frac{1}{\cos\theta} = \frac{\sqrt{10}}{3}$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta} = \left(\frac{1}{\sqrt{10}} \times \frac{\sqrt{10}}{3}\right) = \frac{1}{3}$$

$$\cot\theta = \frac{1}{\tan\theta} = 3$$

********** END **********