FAQs:

1. Define skew lines. Give examples

   Two non-intersecting lines i.e., non-co-planar lines are called skew lines.

   Example: Any two opposite edges of a tetrahedron are skew lines.

2. Define angle between two lines.

   Answer:

   If the lines are co-planar i.e., intersecting then the acute angle between them gives the angle between the lines.

3. What is known as directional cosine of a line?

   Answer:

   If a line makes angle $\alpha, \beta \& \gamma$ with positive direction of the x,y and z-axis respectively, then $\cos\alpha, \cos\beta \& \cos\gamma$ is called the direction cosine of the given line.

4. If a line makes an angle of 30^0,60^0 and 90^0 with the positive direction of x,y,z axes respectively then find its direction cosine.

   Answer:

   The direction cosine of a line which makes an angle of $\alpha, \beta \& \gamma$ with the axes are $\cos\alpha, \cos\beta \& \cos\gamma$. Therefore the direction cosine of the line are $\cos 30^0$, $\cos 60^0$ and $\cos 90^0$ i.e., $\pm\left(\frac{\sqrt{3}}{2}, \frac{1}{2}, 0\right)$

5. Find the direction cosine l,m,n of two lines connected by the relation l-5m+3n=0 and $7l^2 + 5m^2 - 3n^2 = 0$.

   Solution:

In order to compute the values of l,m and n from the given relations we shall first solve these equations,

$$l - 5m + 3n = 0$$

$$\Rightarrow l = 5m - 3n$$

Substituting this value in the second equation we have,

$$7(5m - 3n)^2 + 5m^2 - 3n^2 = 0$$

Hence, $30(2m - n)(3m - 2n) = 0$

i.e., $2m = n \,\&\, 3m = 2n$

therefore, $$\frac{m}{1} = \frac{n}{2} = \frac{(5m - 3n)}{5 - 2 \times 3} = \frac{l}{-1} = \frac{1}{\sqrt{6}}$$

Hence the required direction cosines of the line are $\frac{-1}{\sqrt{6}}, \frac{1}{\sqrt{6}}. \frac{2}{\sqrt{6}} \,\&\, \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}.$