Question 10: If the straight lines (x-1)/2 = (y+1)/k = z/2 and (x+1)/5 = (y+1)/2 = z/k are coplanar, then the plane(s) containing these two lines is (are)

(a) y + 2z = -1

(b) y + z = -1

(c) y − z = -1

(d) y − 2z = -1

Solution:

Given that lines are coplanar.

$$\begin{vmatrix} x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} = 0$$

=>

$$\begin{vmatrix} 2 & 0 & 0 \\ 2 & k & 2 \\ 5 & 2 & k \end{vmatrix} = 0$$

=> k = ±2

For k = 2, equation of the plane is given by

$$\begin{vmatrix} x-1 & y+1 & z \\ 2 & 2 & 2 \\ 5 & 2 & 2 \end{vmatrix} = 0$$

=> y-z+1 = 0

=> y-z = -1

For k = -2, equation of the plane is given by

$$\begin{vmatrix} x-1 & y+1 & z \\ 2 & -2 & 2 \\ 5 & 2 & -2 \end{vmatrix} = 0$$

=> y+z+1 = 0

=> y+z = -1

Hence option b and c are correct.