

**Question 3:** Let P be the image of the point (3, 1, 7) with respect to the plane  $x-y+z = 3$ . Then the equation of the plane passing through P and containing the straight line  $x/1 = y/2 = z/1$  is

- (a)  $x+y-3z = 0$
- (b)  $3x+z = 0$
- (c)  $x-4y+7z = 0$
- (d)  $2x-y = 0$

**Solution:**

Equation of line passing through P is  $(x-3)/1 = (y-1)/-1 = (z-7)/1$

Distance of point P from the given plane =  $-2(6)/3 = -4$

$(x-3)/1 = (y-1)/-1 = (z-7)/1 = -4$

$\Rightarrow x = -1, y = 5, z = 3$

$\Rightarrow P = (-1, 5, 3)$

Equation of plane passing through P is  $a(x+1) + b(y-5) + c(z-3) = 0$

Normal of the plane is perpendicular to the line from which this plane passes through.

So  $a+2b+c = 0$  ..(i)

The plane will also pass through the origin since the line passes through the origin.

So  $a-5b-3c = 0$  ..(ii)

Solving (i) and (ii)

$a/1 = b/-4 = c/7$

Required equation of plane is  $(x+1) -4(y-5) +7(z-3) = 0$

$\Rightarrow x-4y+7z = 0$

Hence option c is the answer.