If x = a, y = b, z = c is a solution of the system of linear equations

x + 8y + 7z = 0

9x + 2y + 3z = 0

x + y + z = 0

such that the point (a, b, c) lies on the plane x + 2y + z = 6, then 2a + b + c equals :

(a) −1 (b) 0 (c) 1 (d) 2

Answer: (c)

Solution:

Given system of linear equations

x + 8y + 7z = 0 …(i)

9x + 2y + 3z = 0 ….(ii)

x + y + z = 0 ….(iii)

Operate: (ii) – 3 x (iii)

6x – y = 0 or y = 6x …..(iv)

Using (iv) in (i)

x + 8(6x) + 7z = 0

z = -7x ……(v)

Since x = a, y = b, z = c (Given)

b = 6a and c = -7a

Also, (a, b, c) lies on the plane x + 2y + z = 6.

Therefore, a + 2b + c = 6 …..(vi)

Putting the values of b and c in (vi),

a + 2(6a) – 7a = 6

=> a = 1

Also, we get b = 6 and c = -7

Now, 2a + b + c = 2(1) + 6 – 7 = 1