

③ Param eq. of the line L:

$$x = 4 + t, \quad y = 2t, \quad z = -5 - t$$

$$\vec{CB} = (-2, 0, 4) \quad \vec{CB} \times \vec{CE} = (-4, 2, -2)$$

$$\vec{CE} = (1, 1, -1)$$

An equation of the plane  $\pi$ :

$$2x - y + z = 5$$

At the intersection point:

$$2(4+t) - (2t) + (-5-t) = 5$$

$$-t = 2, \quad t = -2$$

The intersection point is:

$$\boxed{(2, -4, -3)}$$

④  $(x-2, y+1, z) \cdot (x, y-1, z+1) = 4$

$$x^2 - 2x + y^2 - 1 + z^2 + z = 4$$

$$(x-1)^2 + y^2 + \left(z + \frac{1}{2}\right)^2 = 4 + 1 + 1 + \frac{1}{4}$$

$$(x-1)^2 + y^2 + \left(z + \frac{1}{2}\right)^2 = \left(\frac{5}{2}\right)^2$$

$$\boxed{\text{Centre: } (1, 0, -\frac{1}{2})}$$

$$\boxed{\text{Radius: } \frac{5}{2}}$$