5.1) Since,

④

(a) $\phi(x_1)\theta + b = -1$

$(1,0,0) \cdot \left(0, \pm\frac{1}{2}, \pm\frac{1}{2}\right) + b = -1$

$0 + b = -1$

$\boxed{b = -1}$ ——— (1)

(b) $\phi(x_2)\theta + b = 1$

$(1,2,2) \cdot \left(0, \pm\frac{1}{2}, \pm\frac{1}{2}\right) + b = 1$

$\pm\left(2 \times \frac{1}{2} + 2 \times \frac{1}{2}\right) + b = 1$

$\boxed{b = 1 \pm 2}$ ——— (2)

from (1) & (2) — $\boxed{b = -1}$

$\therefore \theta = \left(0, \frac{1}{2}, \frac{1}{2}\right)$ {from (1)} Ans.