

③

$$|+++ \rangle = |+\rangle \otimes |++ \rangle$$

$$= |+\rangle \otimes |+\rangle \otimes |+\rangle$$

$$= |+\rangle \otimes \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \end{bmatrix} \otimes \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$= |+\rangle \otimes \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \times \begin{bmatrix} 1 \\ 1 \end{bmatrix} \\ 1 \times \begin{bmatrix} 1 \\ 1 \end{bmatrix} \end{bmatrix}$$

$$= |+\rangle \otimes \frac{1}{\sqrt{2}} \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \frac{1}{\sqrt{2}} \frac{1}{\sqrt{2}} \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} \times \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \frac{1}{\sqrt{8}} \begin{bmatrix} 1 \times \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} \\ 1 \times \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} \end{bmatrix}$$

$$= \frac{1}{\sqrt{8}} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$$