2.2.b

$$\rho_{AB} = \frac{1}{2}\begin{vmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{vmatrix}$$

$$|0\rangle_B = \begin{vmatrix} 0 & 0 \\ 0 & 1 \end{vmatrix} + \begin{vmatrix} \end{vmatrix}$$

$$|1\rangle_B = \begin{vmatrix} 1 & 0 \\ 0 & 0 \end{vmatrix}$$

$$\rho_A = \frac{1}{2}\left(|0\rangle_B + |1\rangle_B\right)$$

$$\rho_A = \frac{1}{2}\begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix}$$