

6.5 (b)

$$\text{rank}(A_L) = 2 \neq 1 \Rightarrow \text{not separable}$$

$$\text{rank}(A_P) = 1 \Rightarrow \text{separable}$$

$$A_P = \frac{1}{6} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 \end{bmatrix} = \frac{1}{6} \begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$$

$$\text{rank}(A_B) = 1 \Rightarrow \text{separable}$$

$$A_B = \frac{1}{16} \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 1 \end{bmatrix} = \frac{1}{16} \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

$$\text{rank}(A_S) = 1 \Rightarrow \text{separable}$$

$$A_S = \frac{1}{8} \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 \end{bmatrix} = \frac{1}{8} \begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$$