

Q- $A = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix}$ & $A \cdot \text{adj } A = |A| I$,

then $5a + b$ is equal to -

a) 4

b) 13

c) -1

d) 5

formula

$$A \cdot \text{adj } A = |A| I$$

$$|A| = 10a + 3b$$

$$AA' = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix} \begin{bmatrix} 5a & 3 \\ -b & 2 \end{bmatrix}$$

$$= \begin{bmatrix} 25a^2 + b^2 & 15a - 2b \\ 15a - 2b & 13 \end{bmatrix}$$

$$A \cdot \text{adj}A = AA' \quad (\text{given})$$

$$|A|I = AA'$$

$$\begin{bmatrix} 10a + 3b & 0 \\ 0 & 10a + 3b \end{bmatrix} = \begin{bmatrix} 25a^2 + b^2 & 15a - 2b \\ 15a - 2b & 13 \end{bmatrix}$$

Comparing

$$i) \quad 15a - 2b = 0$$

$$15a = 2b$$

$$\boxed{b = \frac{15a}{2}}$$

→ (1)

$$ii) \quad 10a + 3b = 13$$

$$10a + 3 \times \frac{15a}{2} = 13$$

{ from (1) }

$$65a = 26$$

$$a = \frac{2}{5}$$

$$\boxed{5a = 2}$$

from (1) -

$$b = \frac{2 \times 3}{2}$$

$$\boxed{b = 3}$$

$$\boxed{5a + b = 5}$$

d) is correct.