

ch6-47

$$a) \hat{i} \cdot \hat{i} = (1)(1) \cos 0 = 1$$

$$\hat{j} \cdot \hat{j} = \quad \quad \quad = 1$$

$$\hat{k} \cdot \hat{k} = \quad \quad \quad = 1$$

$$b) \hat{i} \cdot \hat{j} = \hat{i} \cdot \hat{k} = \hat{j} \cdot \hat{k} = (1)(1) \cos(90) = 0$$

$$c) \vec{A} \cdot \vec{B} = (A_x \hat{i} + A_y \hat{j} + A_z \hat{k})(B_x \hat{i} + B_y \hat{j} + B_z \hat{k})$$

$$= A_x B_x (\hat{i} \cdot \hat{i}) + A_y B_y (\hat{j} \cdot \hat{j}) + A_z B_z (\hat{k} \cdot \hat{k}) +$$

$$A_x B_y \hat{i} \cdot \hat{j} + A_x B_z \hat{i} \cdot \hat{k} + A_y B_x \hat{j} \cdot \hat{i} +$$

$$A_y B_z \hat{j} \cdot \hat{k} + A_z B_x \hat{k} \cdot \hat{i} + A_z B_y \hat{k} \cdot \hat{j}$$

$$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y + A_z B_z$$