$$\mathcal{C} \qquad \qquad \mathcal{D}$$

$$A \xrightarrow{f} B \qquad \downarrow t \qquad \downarrow t_A \qquad \downarrow t_B \qquad \downarrow t_B \qquad \downarrow G(A) \xrightarrow{G(f)} G(B)$$