3.

(A)
① 迎際效用均等法則, $MRS = \frac{MU_x}{MU_Y}$

$\frac{Y}{x} = \frac{10}{20} = \frac{1}{2}$ , $x = 2Y$ ——① $= MRT = \frac{P_x}{P_Y}$

② 永不滿足, $1000 = 10x + 20Y$ ——②

①代入② $x^* = 50$
$Y^* = 25$

(B)
Max $U(x,y) = XY$

St $1000 = 20x + 20Y$

① $\frac{Y}{x} = \frac{20}{20}$ , $Y = x$ ——①

② $1000 = 20x + 20Y$ ——②

把①代入② $x^* = 25$
$Y^* = 25$
$U_1 = 625$

(C) Max $U(x,Y) = XY$

St $(1000 - 250) = 10x + 20Y$

① $\frac{Y}{x} = \frac{10}{20} = \frac{1}{2}$

② $750 = 10x + 20Y$

①代入② $x^* = 37.5$
$Y^* = 18.75$
$U^* = 73.125$

(E) (F)
消費者喜欢 所得稅

(G)
Max $U(x,Y) = XY$

St $1250 = 20x + 20Y$

① $\frac{Y}{x} = \frac{20}{20} = 1$ ——①

② $1250 = 20x + 20Y$ ——②

①代入②