1	D	6	D	11	C	16	A
2	D	7	C	12	B		
3	D	8	C	13	A		
4	A	9	B	14	D		
5	B	10	C	15	A		

THEME

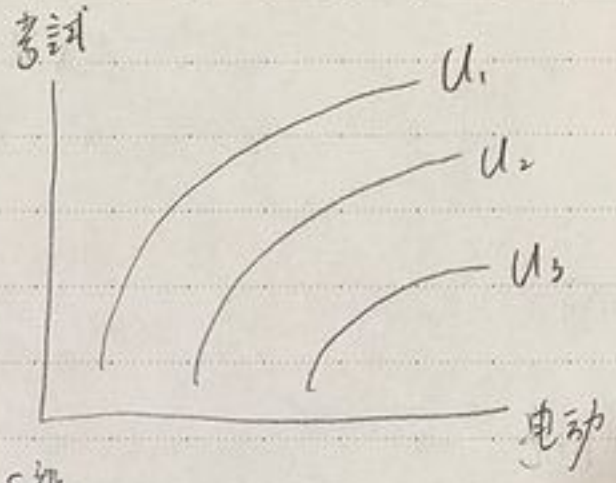
DATE : S M T W T F S WEATHER

MEMBER :

PLACE :

二.

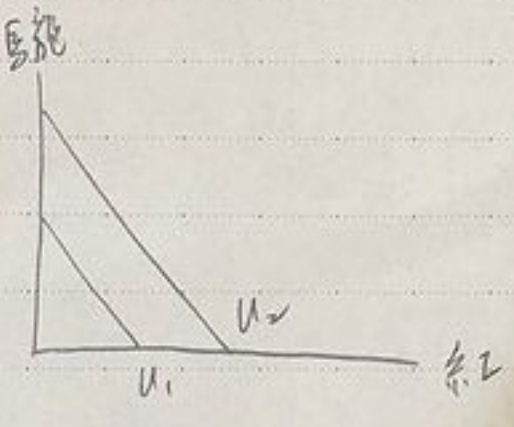
1. (A)



香訊：厭惡 $MU_Y < 0$

電動：喜好 $MU_X > 0$

(B)



完全替代

$U = aX + bY$

2. $U = f(X,Y) = X^{\frac{1}{3}} Y^{\frac{2}{3}}$ $\quad 20X + 10Y = 300$

(1) $\underset{X^*, Y^*}{Max}\ U = X^{\frac{1}{3}} Y^{\frac{2}{3}}$ ← 效用極大化 Model

$s.t.\ 300 = 20X + 10Y$

$L = X^{\frac{1}{3}} Y^{\frac{2}{3}} + \lambda(300 - 20X - 10Y)$

FOC: $\frac{\partial L}{\partial X} = \frac{1}{3} X^{-\frac{2}{3}} Y^{\frac{2}{3}} - 20\lambda = 0$

$\frac{\partial L}{\partial Y} = \frac{2}{3} X^{\frac{1}{3}} Y^{-\frac{1}{3}} - 10\lambda = 0$

$\frac{\frac{1}{3} X^{-\frac{2}{3}} Y^{\frac{2}{3}}}{\frac{2}{3} X^{\frac{1}{3}} Y^{-\frac{1}{3}}} = \frac{20\lambda}{10\lambda} \Rightarrow \frac{1}{2} \frac{Y}{X} = \frac{20}{10}$

$Y = 4X$

$300 = 20X + 10(4X)$

$300 = 20X + 40X$

$X = 5$

$300 = 100 + 10Y$

$Y = 20$

A. $X^* = 5$

$Y^* = 20$

4. $U = X^{\frac{1}{3}}Y^{\frac{2}{3}}$ (1) ICC (2) 恩 Engel's curve (3) 甲PCC (4) 需求

$X = \frac{\frac{1}{3}}{1} \cdot \frac{300}{20} = 5$ 及 Engel's Curve

$\xi_M^X = \xi_M^Y = 1 \Rightarrow$ ICC 為 origin 直線

$\xi_{XY} = 0 \Rightarrow$ 獨立。$\Rightarrow$ PCC 水平線

當及從 20 下降至 10 時 $X = \frac{\frac{1}{3} \cdot 300}{1 \cdot 10} = 10$

$P_X \downarrow \Rightarrow X^* \uparrow \Rightarrow$ 需求曲線負斜率

(2) $X = 3Y$

Max $U = X + 3Y$

s.t. $300 = 20X + 10Y$

$\frac{MU_X}{P_X} = \frac{1}{20} < \frac{MU_Y}{P_Y} = \frac{3}{10} \Rightarrow |MRS_{XY}| = \frac{1}{3} < 2$

全部所得買 Y 財

$X^* = 0$, $Y^* = \frac{300}{10} = 30$, $U^* = 3 \cdot 30 = 90$

(3) $X + 2Y$

Max $U = \min\left(\frac{X}{1}, \frac{Y}{2}\right)$

s.t. $300 = 20X + 10Y$

$\begin{cases} X = \frac{Y}{2} \\ 300 = 20X + 10Y \end{cases} \Rightarrow 20 \cdot \frac{1}{2}Y + 10Y = 300 \quad \begin{cases} X^* = 7.5 \\ Y^* = 15 \end{cases}$

$\Rightarrow 20Y = 300 \quad Y = 15$

效用極大化決策為 $(X^*, Y^*) = (7.5, 15)$

3. Max $U = X^{\frac{1}{3}}Y^{\frac{2}{3}}$, $I = 300$, $P_X = 20$, $P_Y = 10$, $P_X' = 10$

① E_0

$X_0 = \frac{\frac{1}{3} \cdot 300}{20} = 5$

$Y_0 = \frac{\frac{2}{3} \cdot 300}{10} = 20$

$U_0 = 5^{\frac{1}{3}} 20^{\frac{2}{3}} = 12.6$

② E_1

$X_1 = \left(\frac{\frac{1}{3} \cdot 10}{\frac{2}{3} \cdot 10}\right)^{0.63} \cdot 12.6 = 7.94$

$Y_1 = \left(\frac{\frac{2}{3} \cdot 10}{\frac{1}{3} \cdot 10}\right)^{1.26} \cdot 12.6 = 15.88$

$E = 10 \times 7.94 + 10 \times 15.88 = 138.2$

③ E_2

$X_2 = \frac{\frac{1}{3} \cdot 300}{10} = 10$

$Y_2 = \frac{\frac{2}{3} \cdot 300}{10} = 20$

$U = 10^{\frac{1}{3}} 20^{\frac{2}{3}} = 15.87$

(1) PE $(E_0 \to E_2)$ $\begin{cases} X: 5 \\ Y: 0 \end{cases}$ (2) IE $(E_1 \to E_2)$ $\begin{cases} X: 2.06 \\ Y: 4.12 \end{cases}$ (3) SE $(E_0 \to E_1)$ $\begin{cases} X: 2.94 \\ Y: -4.12 \end{cases}$