

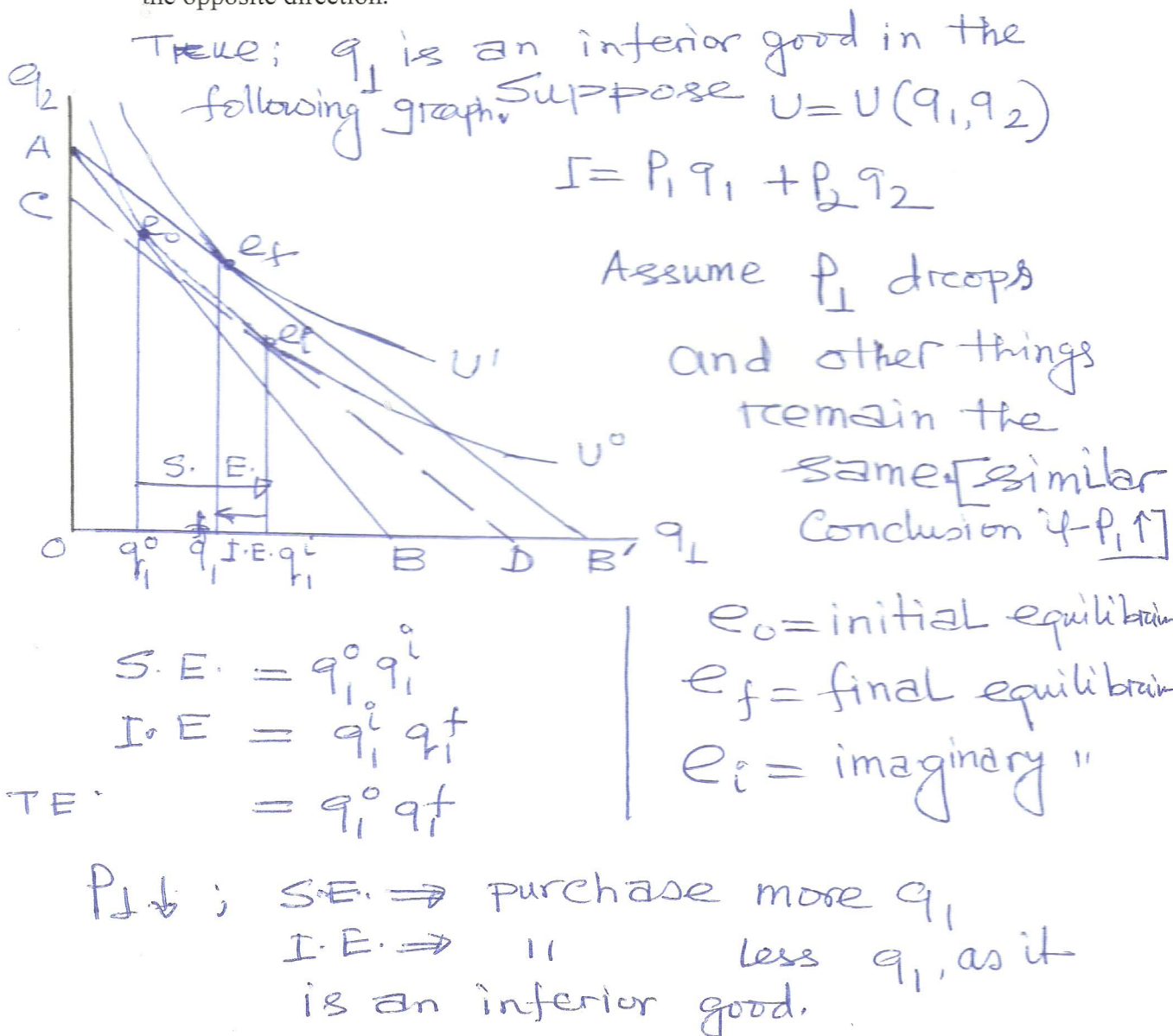
(Key points) Students need to write detailed answers

1. (2*3 = 6 marks) State whether you agree or disagree with each of the following statements. Using appropriate **diagrams**, **explain** your response.

a. Two indifference curves cannot intersect.

True; See Ch.03--Figure 3.2

b. For an inferior good, income effect and substitution effect would move in the opposite direction.



2. (3) a. What is the law of demand? Explain how would you derive the demand curve of a good from its price consumption curve.

Ch04--Figure 4.2

(6)b. Suppose that the following equations describe the utility and budget constraint of Michael:

$$U = q_1 q_2$$

$$I = p_1 q_1 + p_2 q_2$$

Assume $I = \$150$, $P_1 = \$3$ and $P_2 = \$5$.

- i. Find Michael's utility-maximizing bundle, and his level of utility.
- ii. Suppose new $P_1 = \$6$; find the new level of utility.
- iii. Find the compensated bundle at the new price ratio. Calculate the substitution and income effects of this price change. Graph your results.

① At equilibrium [utility maximizing bundle]

$$MRS = MRT$$

$$-\frac{MU_1}{MU_2} = -\frac{P_1}{P_2}$$

$$\frac{q_2}{q_1} = \frac{P_1}{P_2} \therefore P_1 q_1 = P_2 q_2$$

$$\therefore q_2 = \frac{P_1 q_1}{P_2}$$

$$\frac{q_2}{q_1} = \frac{3}{5} \quad \text{or} \quad q_2 = \frac{3q_1}{5}$$

$$\left. \begin{aligned} U &= q_1 q_2 \\ MU_1 &= \frac{\partial U}{\partial q_1} = q_2 \\ MU_2 &= \frac{\partial U}{\partial q_2} = q_1 \end{aligned} \right\}$$

$$I = P_1 q_1 + P_2 q_2$$

$$150 = 3q_1 + 5q_2$$

$$150 = 3q_1 + 5\left(\frac{3q_1}{5}\right)$$

$$6q_1 = 150$$

$$q_1 = 25 \text{ units}$$

$$\therefore q_2 = 15 \text{ units}$$

$$\left. \begin{aligned} q_1 &= 25 \text{ units} \\ q_2 &= 15 \text{ units} \end{aligned} \right\} \therefore U = 375 \text{ utils}$$

② if $P_1 = \$6$

$$150 = 6q_1 + 5q_2 \quad \& \quad 5q_2 = 6q_1$$

$$12q_1 = 150$$

$$q_1 = 12.5 \text{ or } 13$$

$$q_2 = 15.6 \text{ or } 16$$

$$\left. \begin{aligned} \therefore U' &= 195 \\ \text{or} \\ U' &= 13 \times 16 = 208 \end{aligned} \right\}$$

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Initial utility, $U = 375$ utils

$-MRS = -MRT$

$$\frac{q_2}{q_1} = \frac{6}{5}$$

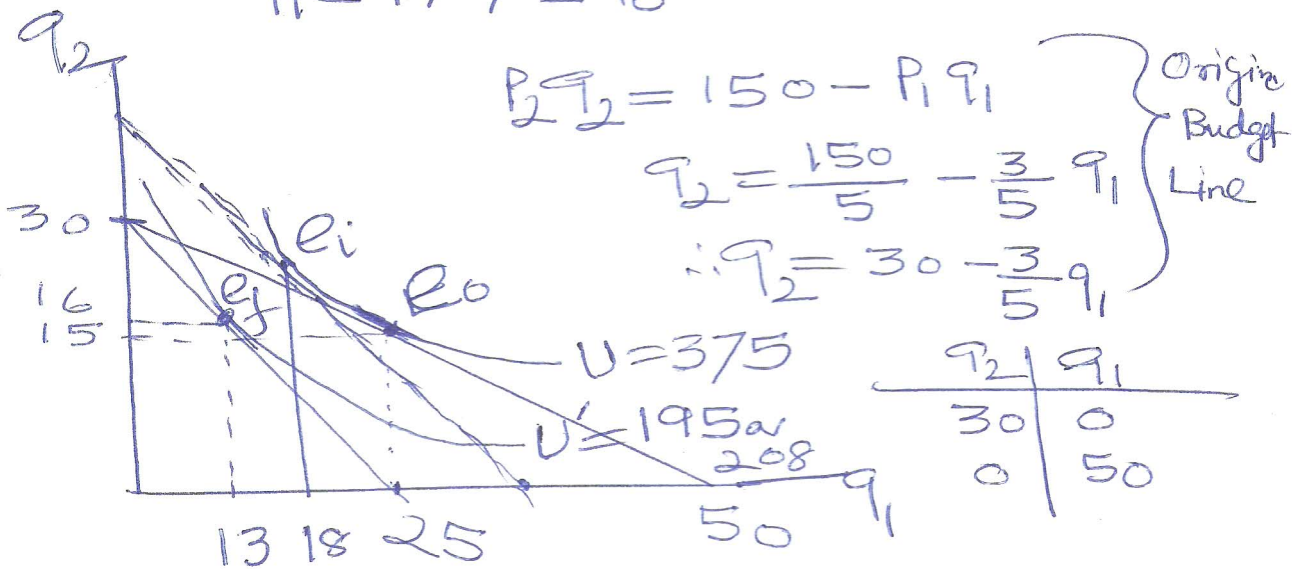
$$\therefore q_2 = \frac{6q_1}{5}$$

$$q_1 \cdot \frac{6q_1}{5} = 375$$

$$q_1^2 = \frac{375 \times 5}{6} = \frac{1875}{6} = 312.5$$

$$q_1 = 17.7 \approx 18$$

Note: the answers may differ due to rounding.



S.E. = 25 - 18 = 7 units
 I.E. = 18 - 13 = 5 units
 T.E. = 25 - 13 = 12 units
 With new $P_1 = \$16$, TE = 12 units ↓ in q_1 .



Part B

Answer all (copy answers in the exam booklet) by choosing the best (6)

- 1) According to the Law of Demand, the demand curve for a good will
 A) shift leftward when the price of the good increases.
 B) shift rightward when the price of the good increases.
C) slope downward.
 D) slope upward
- 2) If the demand for oranges is written as $Q = 100 - 5p$, then the inverse demand function is
 A) $Q = 5p - 100$. B) $Q = 20 - .2p$.
 C) $p = 20 - 5Q$. D) **$p = 20 - .2Q$.**
- 3) Consider the demand function $Q_d = 150 - 2P$. The effects of other determinants of Q_d is reflected in
A) the intercept of the function.
 B) the slope of the function.
 C) neither the slope nor the intercept of the function.
 D) in both the slope and the intercept of the function.
- 4) Suppose the inverse demand curve for a good is expressed as $Q = 50 - 2p$. If the good currently sells for \$3, then the price elasticity of demand is
 A) $-3 * (2/50)$. B) $-2 * (50/3)$.
C) $-2 * (3/44)$. D) $-3 * (44/2)$.
 $(dQ/dP)*(p/Q) = -2(3/44)$
- 5) Sarah has the utility function $U(X, Y) = X^{.5}Y^{.25}$. When Sarah consumes $X=2$ and $Y=6$ she has a marginal rate of substitution of
 A) -12 B) -1/6 **C) -6** D) -1/12
- $MRS = -(MU_x/MU_y) = -(.5Y/.25X) = -(.5*6/.25*2) = -6$
- 6) As the price of a good increases, the change in the quantity demanded can be shown by
 A) shifting the demand curve leftward.
 B) shifting the demand curve rightward.
 C) moving down along the same demand curve.
D) moving up along the same demand curve.

Answers must be copied in the exam booklet