(1)

1. False. If the slope of the budget line is the same as the slope of the IC, then the entire budget line is the set of equilibria.

2. Originally A spends Rs. 400 on food. After receiving Rs. 200 from the government, his income increases by 20%. His income elasticity of food is 2 ⇒ his spending on food rises by 40%.
⇒ it will now be 400 + 160 = Rs. 560. But 560 is 47% of 1200 ⇒ the government does not achieve its goal.

False.

3. ~~Uncertain. The first part is false~~ True.

4. False. In some equilibrium this is the case, in some it is not (e.g. Prisoner's Dilemma).

(2) (i) $U(x,y) = 2\sqrt{x} + y$; $I = 100$, $p_x = 3$, $p_y = 1$. P_x falls to 2.

The initial equilibrium bundle: $\frac{MU_x}{MU_y} = \frac{P_x}{P_y} \Rightarrow \underbrace{(x = .11, y = 99.67)}_{A}$

The final (post-price fall) bundle: $\underbrace{(x = .25, y = 95.5)}_{C}$.

Total effect: $.25 - .11 = .14$.

Quasilinear utility: one can show that income effect $= 0$; TE = SE.

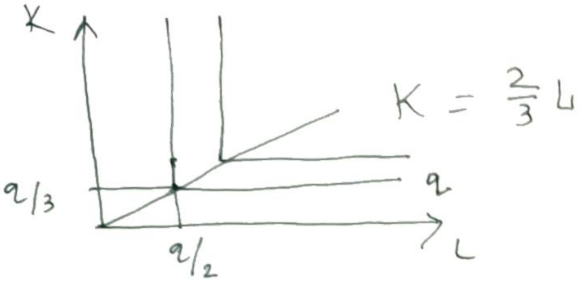
To show this find the decomposition bundle B, where the consumer's utility is the same as A: $2\sqrt{.11} + 99.67 = 100.33$.

The decomposition budget line has the same slope as the new budget line: $\frac{P_x'}{P_y} = \frac{2}{1} \Rightarrow B = (.25, 99.33)$.

Hence IE = 0, SE = .14.

(3) (ii) $f(L,K) = \text{Min}\{2L, 3K\}$. The co-ordinates of the kink pt are $\left(\frac{q}{2}, \frac{q}{3}\right)$, where q is the output level corresponding to isoquant. Thus on L-K plane, the equation would be

$$K = \frac{2}{3}L.$$



(4) (iii) Profit function: $\Pi = \bar{p}\cdot f(L^*, K^*) - wL^* - rK^*$. Since L^* and K^* are given by $p \cdot MP_L = w$; $p \cdot MP_K = r$, it is easy to see that if $\Pi = \xi(w) + \varphi(r)$, then $L^* = L^*(w)$ and $K^* = K^*(r)$, i.e. labor demand & capital demand are functions of only w and r. This in turn implies the MP_L and MP_K depend only on L and K respectively $\Rightarrow$ $f(L,K) = \phi_1(L) + \phi_2(K)$, where ϕ_i is any increasing function satisfying usual properties.

(5) (iv) The monopolist's problem is to find the cost function $C(y)$ in the following way: $C(y) = \text{Min}\{4\sqrt{y_1} + 2\sqrt{y_2} \,;\, y_1 + y_2 \geq y\}$

Standard interior solution requires:

$$MC_1(y_1) = MC_2(y_2) \Rightarrow y_1 = y/5,\ y_2 = 4y/5.$$

But crucial observation: since the cost function is concave, the optimal solution occurs at a boundary, i.e. $C(y) = 2\sqrt{y}$.

i.e. entire production would take place in plant 2.

(v) The input demand function $x = 10 - w/2$

The profit function is $20x - x^2 - wx = [10 - w/2]^2$.

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$F(L,K) = h(H(L,K))$, where h is a monotonic transformation.
H is homogeneous of degree 1 in L, K.

Note $\quad MRTS = \dfrac{\partial F/\partial L}{\partial F/\partial K} = \dfrac{h'.\,\partial H/\partial L}{h'.\,\partial H/\partial K} = \dfrac{\partial H/\partial L}{\partial H/\partial K}$.

Since H is homogeneous of degree 1 in (L,K), one can show that $\partial H/\partial L$ & $\partial H/\partial K$ are both homogeneous of degree 0 in (L,K).

Thus $\dfrac{\partial H}{\partial L} = P_1(L,K)$; $\dfrac{\partial H}{\partial K} = P_2(L,K)$
$= P_1(tL, tK)$ $\qquad = P_2(tL, tK)$; $t > 0$.

Hence MRTS at L, K = MRTS at (tL, tK).

(4) Discussed in the class in details.

(5) Discussed in the class in details.