

Model Answer

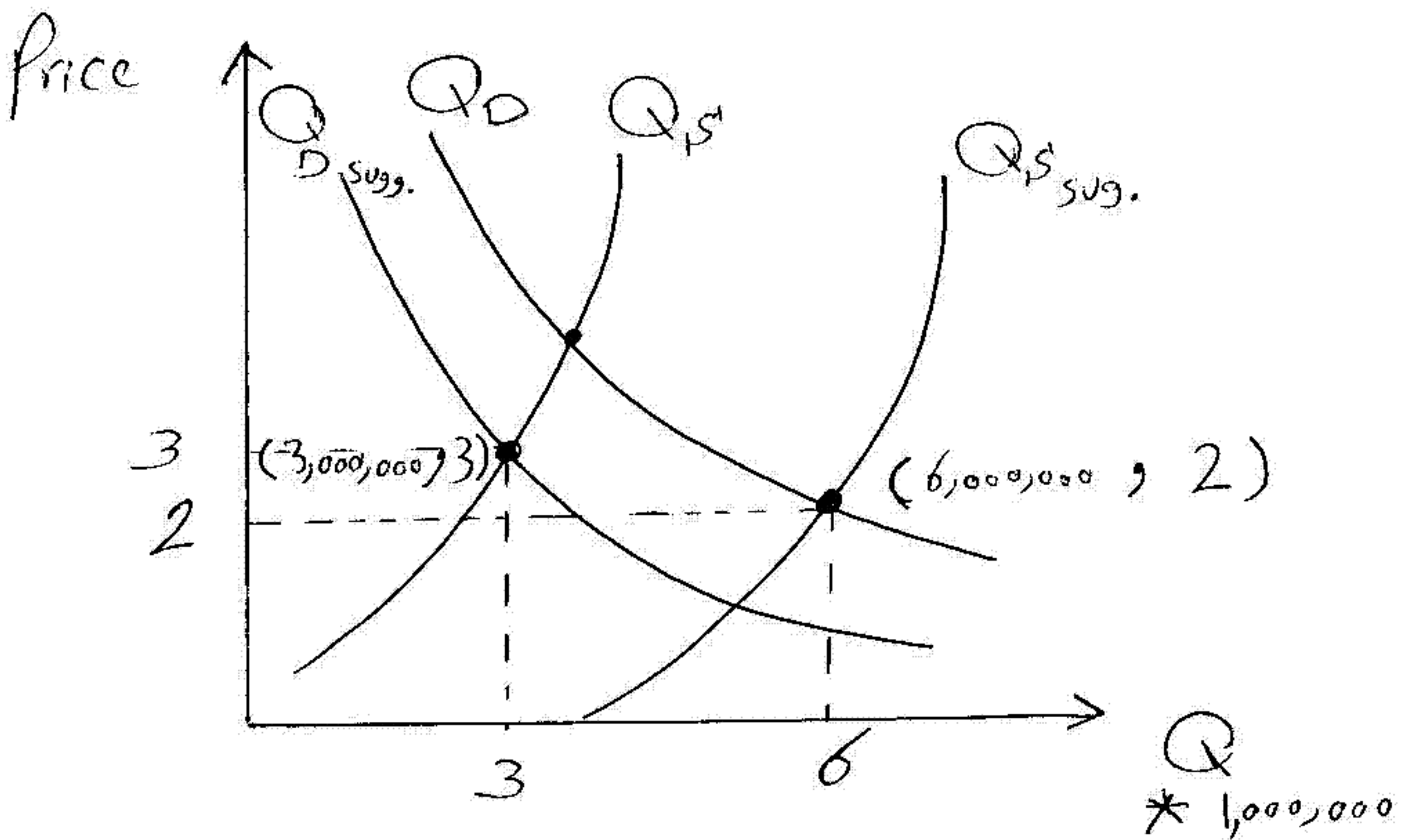
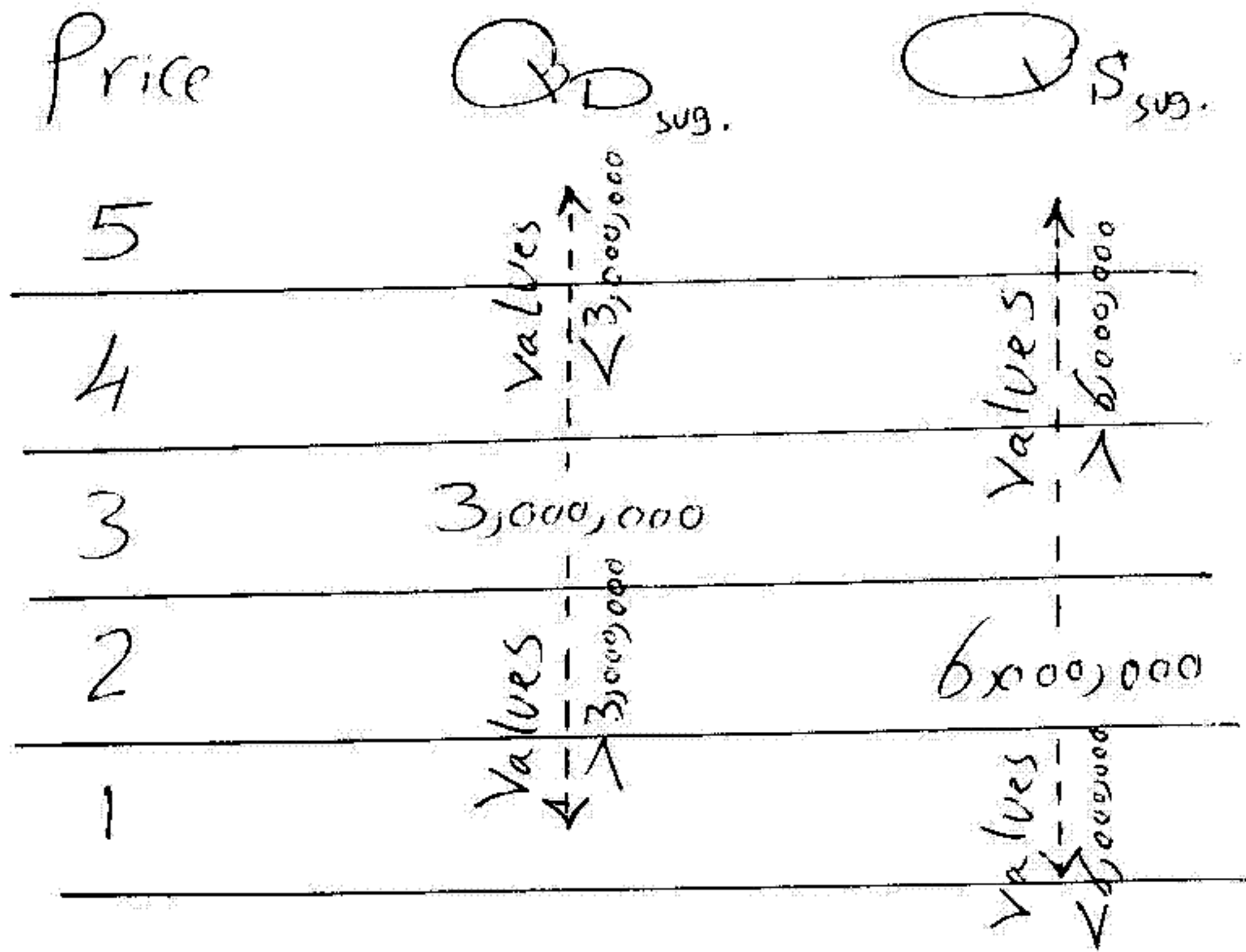
Engineering Economy and Financing

2<sup>nd</sup> year civil

1<sup>st</sup> term exam 2009-2010

# Question (1)

1-



## Question (2)

1- \* For year 2009

$$F.U.S.P = 0.3(100) + 0.4(120) + 0.3(20) = \$138$$

$$F.U.C.M = 0.3(25) + 0.4(24) + 0.3(80) = \$41.10$$

$$F.U.V.C = 138 - 41.10 = \$96.90$$

$$\text{Profit}_{2009} = 10000(138) - [100,000 + 96.9 \times 100,000] \\ = \$311,000$$

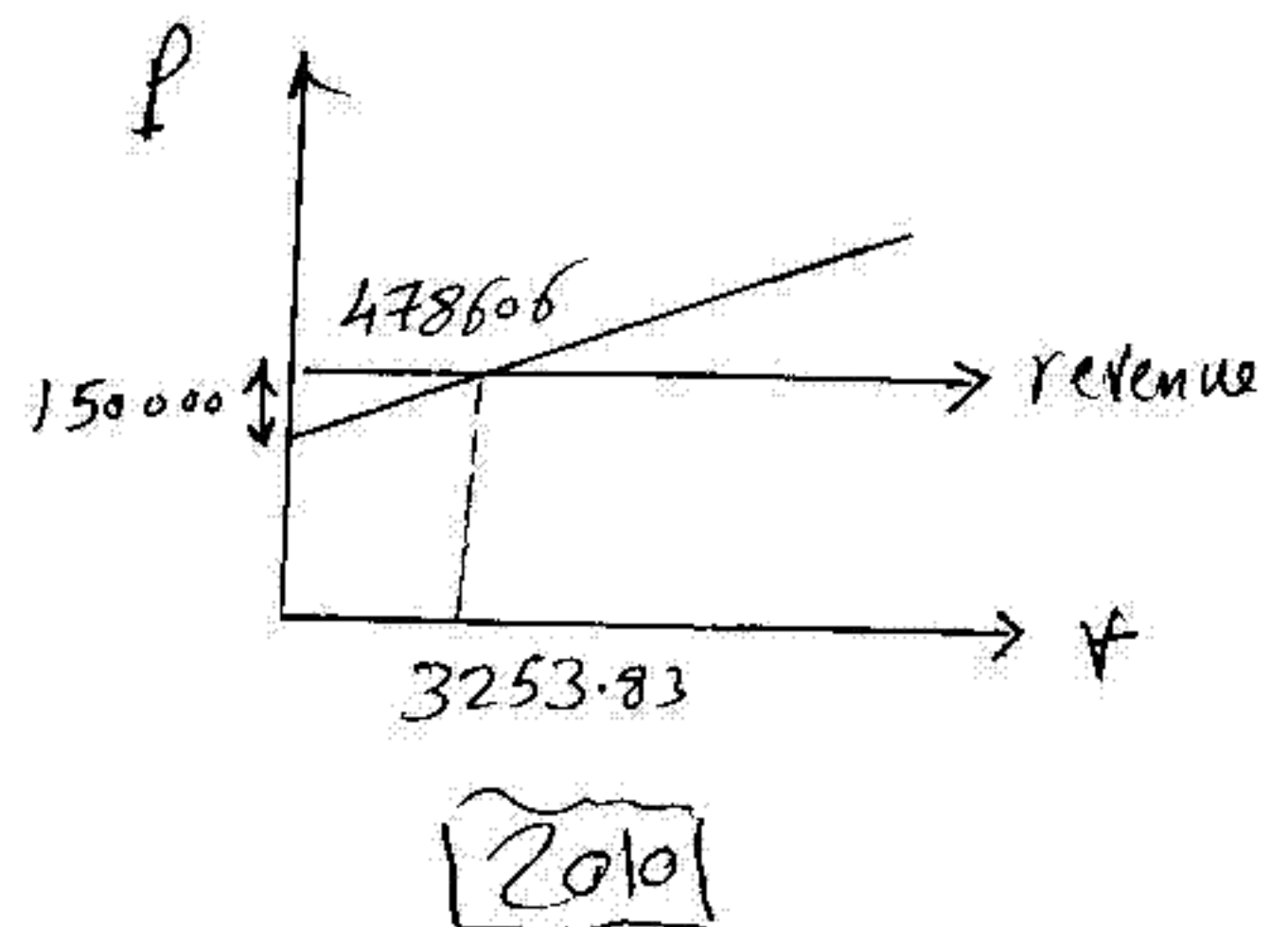
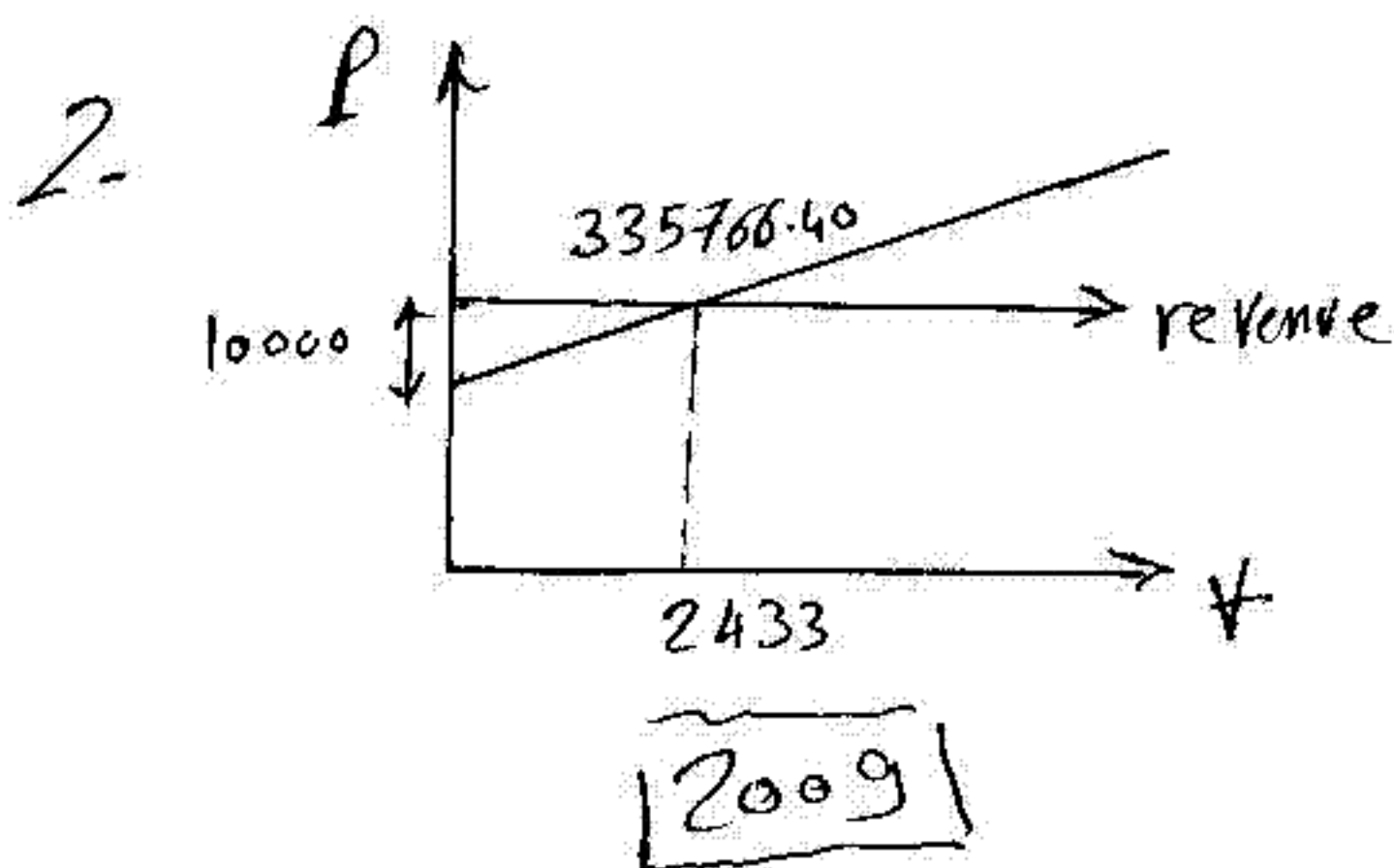
\* To earn the same profit :-

$$100X + 4000(120) + Y(200) - [150,000 + 75X + 4000 \times 96 + 120Y] \\ = 311,000$$

$$25X + 80Y = 365,000 \quad \begin{cases} X + Y = 6000 \end{cases}$$

$$\text{Prod}_1 = 2091 \text{ units}$$

$$\text{Prod}_2 = 3909 \text{ units}$$



3- Prod. line 3, which has a high value of U.C.M

### Question (3)

For Bank (1)

$$50,000 = 10,000(1+i)^{20} + 1000 \left[ \frac{(1+i)^{20} - 1}{i} \right] - 1000$$

$i$	F
4%	50689.31
3%	43931.48
3.9%	49964

∴  $i \approx 3.9\%$

For Bank (2)

$$48,000 = 5000(1+i)^{20} + 1250 \left[ \frac{(1+i)^{20} - 1}{i} \right] - 1250$$

$i$	F
3.9%	46335.58
5%	53348.93
4.2%	48139.37

∴  $i \approx 4.20\%$

Select bank of high  $(i)$

⇒ The second bank

## Question (4)

①

$$FV = 50 \left[ \frac{(1+0.2)^{16} - 1}{0.2} \right] - 50 + 10 \left[ \frac{(1+0.2)^6 - 1 - 6(0.2)}{(0.2)^2} \right] (1+0.2)^6$$
$$= 4908.84$$

②

$$FV = 4908.84 - 80(1+0.2)^8 - 80(1+0.2)^7$$
$$= 4242.36$$

③

$$FV = \left\{ 50 \left[ \frac{(1+0.2)^6 - 1}{0.2} \right] + 10 \left[ \frac{(1+0.2)^6 - 1 - 6(0.2)}{(0.2)^2} \right] \right\} (1+0.2)^6$$
$$+ 5 \left[ \frac{(1+0.2)^6 - 1 - 6(0.2)}{(0.2)^2} \right]^2 (1+0.2)^{-16}$$
$$= 273.527$$

④

$$FV = 273.527 * 2 = 547.054$$

⑤

$$FV = 30 \left[ \frac{(1+0.2)^6 - 1}{0.2} \right] - 30 - 40(1+0.2)^{11}$$
$$- 40(1+0.2)^{10} - 40(1+0.2)^9 - 40(1+0.2)^5$$
$$- 40(1+0.2)^4 = 1659.52$$

## Question (5)

B-

Cost present value

$$= 200 + 30 \left[ \frac{(1+i)^{18} - 1}{i(1+i)^{18}} \right] + 5 \left[ \frac{(1+i)^7 - 1 - 7i}{i^2(1+i)^7} \right] (1+i)^{-3} \\ - 5 \left[ \frac{(1+i)^6 - 1 - 6i}{i^2(1+i)^6} \right] (1+i)^{-12}$$

Benefit present value

$$= 55 \left[ \frac{(1+i)^{18} - 1}{i(1+i)^{18}} \right]$$

$$C.P.V = 409.93$$

$$B.P.V = 337.038$$

$$N.P.V = B.P.V - C.P.V = -72.892$$

— The project is not feasible

\* To find IRR

$$\text{Put } N.P.V = 0.0$$

$$\implies i \approx 8\%$$