390
Assignment I
Answers

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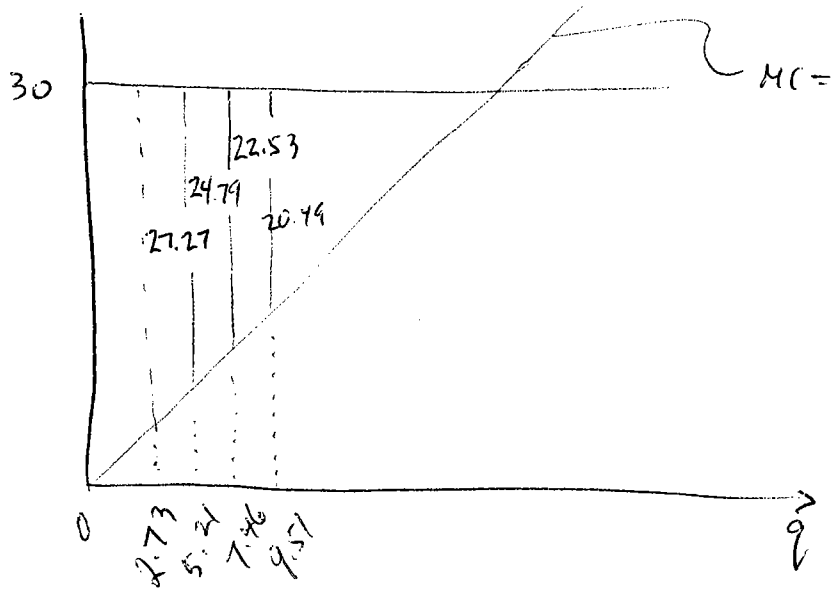
Oct. 2004

(1)




$$\frac{30 - MC(q_T)}{1.1} = 30 - MC(q_{T-1}) \qquad MC(q_T) = 0$$

$$= 30 - [0 + q_{T-1}]$$

$$q_{T-1} = 2.73$$

$$\frac{30 - MC(q_{T-1})}{1.1} = 30 - MC(q_{T-2})$$

$$\frac{27.27}{1.1} = 30 - [0 + q_{T-2}]$$

$$q_{T-2} = 5.21$$

$$\vdots$$

$$q_{T-3} = 7.46$$

$$q_{T-4} = 9.51$$

2. (b) $C = \pi(q) - [p - MC]q + rB$

$= \pi(q_{t-3}) - [p - MC]q_{t-3} + rB_{t-3}$

$= P_{t-3}q_{t-3} - C(q_{t-3}) - [30 - 7.46][7.46] + 0.1[70]$

$= 30[7.46] - \frac{[7.46]^2}{2} - [30 - 7.46](7.46] + 0.1(70]$

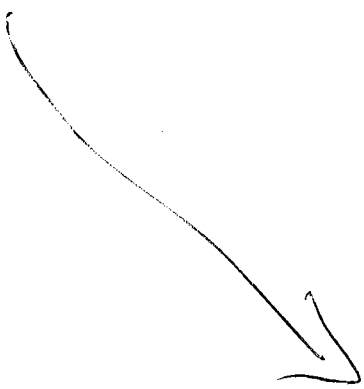
$= 34.9$

(a) Current investment in FUND is

$[P_{t-3} - MC_{t-3}]q_{t-3}$

$= 168.15$

3.



(3)


(a) $Q_T = 0$

$$\frac{P - c}{1.1} = P_{t-1} - c$$

$$\frac{20-4}{1.1} = \left[20 - \frac{1}{2} Q_{T-1}\right] - 4$$

$$14.56 = 16 - \frac{1}{2} Q_{T-1}$$

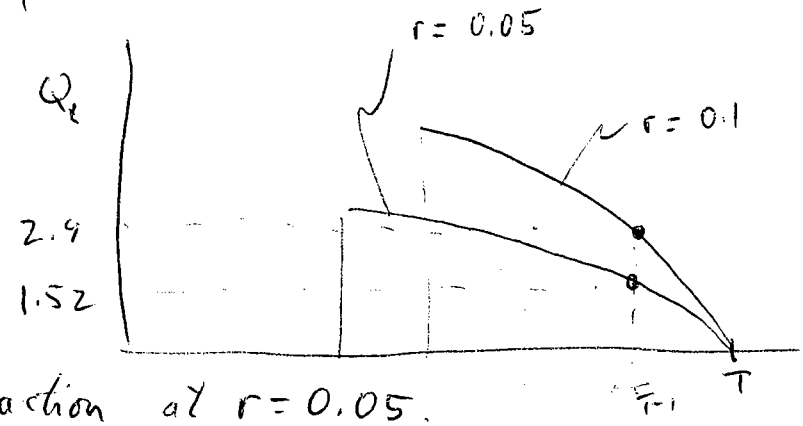
$$Q_{T-1} = 2.90$$

New interest rate (5%)

$$15.23 = 16 - \frac{1}{2} Q_{T-1}$$

$$Q_{T-1} = 1.52$$

Hence




slower extraction at $r = 0.05$.

(3) (b) $c = \$4$ $\quad r = 0.1$

$Q_T = 0$

$Q_{T-1} = 2.90$

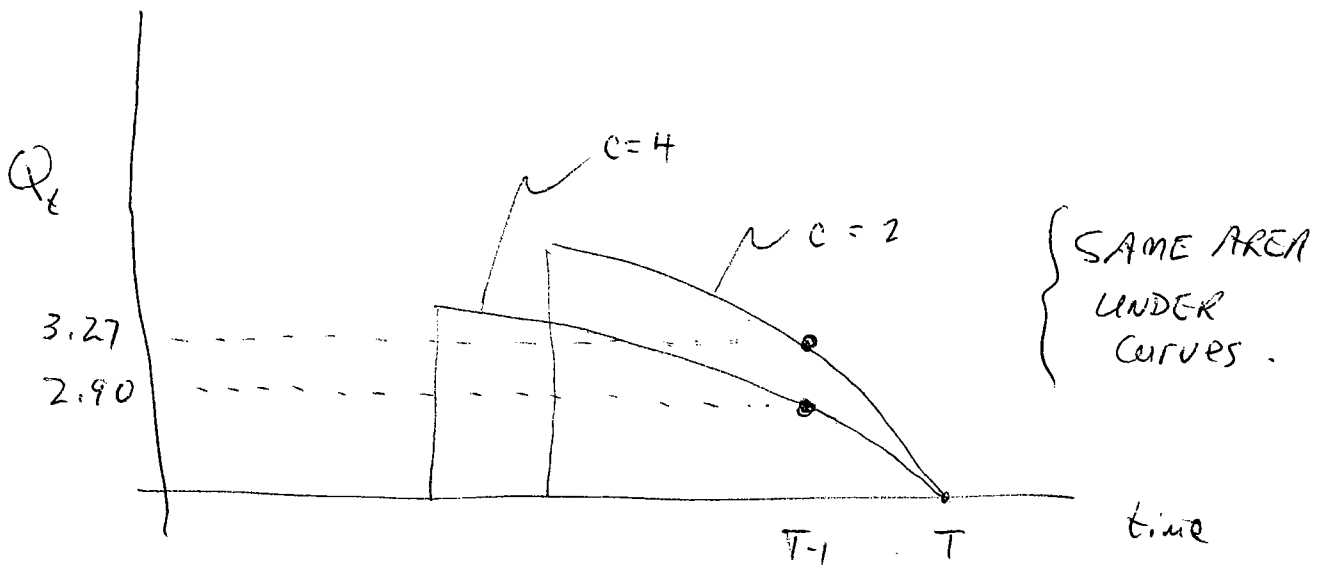
New c at $\$2 \rightarrow \dfrac{P_T - c}{1.1} = P_{T-1} - c$

$$\frac{20-2}{1.1} = \left[20 - \tfrac{1}{2} Q_{T-1}\right] - 2$$

$$16.30 = 18 - \tfrac{1}{2} Q_{T-1}$$

$$Q_{T-1} = 3.27$$

Hence




lower cost implies faster depletion