P1.

(1) All-units discount

$\lambda = 500$, $C_0 = 1490$, $C_1 = 1220$, $C_2 = 1100$, $K = 2250$, $i = \frac{0.25}{365}$

$g_j(Q) = C_j \cdot \lambda + \frac{K\lambda}{Q} + \frac{i \cdot C_j Q}{2}$

$Q_1^* = 1484.8$, $Q_2^* = 1640.9$, $Q_3^* = 1728.1$

Only Q_2^* is feasible. So we calculate $g(1200)$, $g(Q_2^*)$, $g(2400)$ to find the optimal sol.

$g(Q/1200) = 746549.8$

$g(1640.9) = 611371.2$

$g(Q\downarrow 2400) = 551372.9$

Therefore, $Q = 2400$ is the optimal amount, and $g(Q) = 5.5 \times 10^5$

(2) Incremental Discount

$\bar{C}_1 = C_0(b_1 - b_0) - C_1 b_1 = 324000$

$\bar{C}_2 = C_0(b_1 - b_0) + C_1(b_2 - b_1) - C_2 b_2 = 612000$

$Q_1^* = \sqrt{\frac{2 \cdot (2250+0) \cdot 500}{0.25/365 \cdot 1490}} = 1484.8$

$Q_2^* = \sqrt{\frac{2 \cdot (2250+324000) \cdot 500}{0.25/365 \cdot 1220}} = 19759.3$

$Q_3^* = \sqrt{\frac{2 \cdot (2250+612000) \cdot 500}{0.25/365 \cdot 1100}} = 28553.1$

Only Q_3^* is feasible. We calculate ~~求~~ $g(1200)$, $g(2400)$, $g(Q_3^*)$

$g(1200) = 746549.8$

$g(2400) = 679082.4$

$g(28553.1) = 571722.2$

$\Rightarrow Q = 28553.1$ is the optimal solution. $g(Q) = 571722.2$