Signaling Efficiency.

(1) monopoly problem -

$$\max_q \ (100-2q)\times q - \beta q \Rightarrow 100 - 4q - \beta = 0$$

monopoly quantity is $q^M(\beta) = \frac{100-\beta}{4}$

monopoly price is $p^M(\beta) = 50 + \frac{1}{2}\beta$

(2) If $p = 50 + \frac{1}{2}\beta$ and I make the guess that the firm is maximizing profit, then I can deduce β from p : $\beta = 2p - 100$

I also know that $p^M(\beta) \uparrow$ in β : high prices signal high marginal cost.

(3) if $\beta = 0$, then $p^M = 50$
if $\beta = 100$, then $p^M = 100$.
Besides if $\beta = 100$, it is not optimal to offer 50
if $p = 50$, then $q = 25$ and profit is negative -

If consumer observes $p = 50$, $\pi(\beta = 0 \mid p = 50) = 1$
$\pi(\beta = 100 \mid p = 50) = 0$

In this economy, efficient firm signal efficiency by charging $p = 50$ (monopoly price) and inefficient firms do not survive -

Wages and tasks.

Expected payoff of the employee is

$$\frac{h}{40} \times w^{C} + \left(1-\frac{h}{40}\right) w^{NC} - \frac{h^2}{2}$$ if he works h hours.

He accepts to work if

$$\frac{h}{40} \times w^{C} + \left(1-\frac{h}{40}\right) w^{NC} - \frac{h^2}{2} \geq 0$$

and he chooses h^* that maximizes his payoff.

$$\max_{h} \frac{h}{40} \times w^{C} + \left(1-\frac{h}{40}\right) w^{NC} - \frac{h^2}{2}$$

$$\frac{1}{40}\left[w^{C} - w^{NC}\right] = h^*$$

To generate $h^* = 20$ it is necessary to choose w^C and w^{NC} such that

$$\begin{cases} \frac{1}{40}\left[w^{C} - w^{NC}\right] = 20 & (1) \\ \frac{20}{40} \times w^{C} + \left(1-\frac{20}{40}\right) w^{NC} - \frac{(20)^2}{2} \geq 0 & (2) \end{cases}$$

$$\Rightarrow \begin{cases} w^{C} = 800 + w^{NC} & (1') \\ w^{NC} + 200 \geq 0 & (2') \end{cases}$$

Choose $w^{NC} = -200$ and $w^{C} = 600$ is the best for the employer.