1. (a) There is no asymmetry of information. ***(+10 pts)***

   (b) Outcome could be inefficient as there are cases when trade opportunities are not exploited. ***(+10 pts)***

   (c) Expected profit of B: $E(\pi) = (p - c) * (1 - F(p))$

   Answer: $p = \frac{c+\overline{v}}{2}$ ***(+8 pts)***

2. (a) Various answers. ***(+5 pts)***

   (b) There is hidden action, which indicates the presence of moral hazard. ***(+5 pts)***

   (c) IC: $Expected\ Utility\ (cheating) \geq Expected\ Utility\ (no\ cheating)$ ***(+5 pts)***

   IC: $(1-p) * (Utility(grade = 40) * 0{,}5 + Utility(grade = 60) * 0{,}5) \geq Utility(grade = 40) * 0{,}25 + Utility(grade = 60) * 0{,}25$ ***(+3 pts)***

   $so,\ p \leq \frac{1}{2}$ ***(+2 pts)***

   (d) Assume penalty for cheating is some x that tends to minus infinity, so utility of x is negative

   IC becomes:

   $p \leq \frac{EU(no\ cheating)}{EU(cheating\ succesfully) - Utility(x)}$ ***(+3 pts)***

   As in this case $Utility(x)$ approaches minus infinity, p is equal to zero. So, high enough penalty successfully discourages cheating. ***(+2 pts)***

3. (a) Yes, as probability of success with high effort is higher than probability of success with low effort (50% vs. 40%). ***(+10 pts)***

   (b) Effort Is unobservable, so the residual claimant (RC) has two options:

   $E = 0$: $w = 16$ (reservation wage); $E\Pi = 0{,}4\Pi_H + 0{,}6\Pi_L - 16$ ***(+3 pts)***

   $E = 1$: Make up such a contract that manager exerts full effort and RC maximizes expected net profit:

$$\max_{w_h, w_l} 0{,}5 * (\Pi_H - w_H) + 0{,}5 * (\Pi_L - w_L)$$

   s.t.

   IR: $0{,}5 * \left(w_h^{\frac{1}{2}} - 1\right) + 0{,}5 * \left(w_L^{\frac{1}{2}} - 1\right) \geq 4$

   IC: $0{,}5 * \left(w_h^{\frac{1}{2}} - 1\right) + 0{,}5 * \left(w_L^{\frac{1}{2}} - 1\right) \geq 0{,}4 * \left(w_h^{\frac{1}{2}}\right) + 0{,}6 * \left(w_L^{\frac{1}{2}}\right)$

   That yields: $w_L = 0, w_H = 100$ and $E(net\ profit) = 0{,}5 * \Pi_H + 0{,}5 * \Pi_L - 50$ ***(+7 pts)***

   $E = 1$i s preferred to $E = 0$ if $E(net\ profit|high\ effort) \geq E(net\ profit|\ low\ effort)$, what is equivalent to $\Pi_H - \Pi_L \geq 340$ ***(+2 pts)***

   So, optimal contract is:

$$w = \begin{cases} w_0 = 16, \; if\ \Pi_H - \Pi_L < 340 \\ \begin{cases} w_H = 100 \\ w_L = 0 \end{cases} if\ \Pi_H - \Pi_L \geq\ 340 \end{cases}$$ ***(+3 pts)***

(c) If information is observable contract will be contingent on effort:

$e = 0: w_0 = 16, E(net\,profit) = 0{,}4 * \Pi_H + 0{,}6 * \Pi_L - 16$ ***(+2 pts)***

$e = 1: w = 25, E(net\,profit) = 0{,}5 * \Pi_\mathrm{H} + 0{,}5 * \Pi_L - 25$ ***(+3 pts)***

High effort is chosen when $\Pi_\mathrm{H} - \Pi_\mathrm{L} \geq 90$ ***(+1 pts)***

So, we have following cases:

i. If $\Pi_\mathrm{H} - \Pi_\mathrm{L} < 90$; Costs=0. ***(+3 pts)***

ii. If $90 < \Pi_\mathrm{H} - \Pi_\mathrm{L} < 340$; Costs = $0{,}1 * \Pi_H - 0{,}1 * \Pi_L - 9$ ***(+3 pts)***

iii. If $\Pi_H - \Pi_L \geq\ 340$; Costs=25 ***(+3 pts)***

4. 3+2=5 ***(+10 pts)***