3. Let \( p \) be such for choice a & \( 1-p \) for b.

\[
E(C) = p \cdot 4 + (1-p) 5 = 4 + p
\]
\[
E(D) = p \cdot 5 + (1-p) 4 = 5 - p
\]

With belief \( q = \mu(C) \) the expectation of information set \( \{C, D\} \) is

\[
E(\{C, D\}) = q \cdot (4+p) + (1-q) \cdot (5-p)
= 4 - q + p \cdot (2q -1)
\]

For \( q > 0.5 \), maximize by taking \( p = 1 \).

For \( q < 0.5 \) " " " " \( p = 0 \).

For \( q = 0.5 \), any choice of \( p \) works.

4. It is not a subgame perfect equilibrium, because starting at A player 2 can improve his/her payoff by picking AC, this gives G with payoff of 3 rather than I with payoff of 2.

For Nash:

Player 2 can only affect payoff by picking between BJ & BK. The choice of BK has larger payoff for player 2 so this is OK.

Player 1 can make choices to get to H, I, or K. In play 1, there have payoffs of 1, 2, 3. The highest 3, so this is a Nash equilibrium.