1) HOMEWORK 2 (ASP with NOT)

A) Π^{S_1} = p ← r, not s.
    r.

    given S_1 = {r}
        p ← not s
        r (since r is in S_1)
    now the modified program is
        p ← r
        r

    Therefore, Π^{S_1} = {p, r}.

B) S_1 is not an answer set of S_1 because
    the answer set of the reduct is
    {p, r}

C) Π^{S_2} = p ← r, not s
        r

    given = S2 = {p, r}
        p ← r   } modified
        r   } Program

    Π^{S_2} is an answer set because R is asserted
    and p is asserted based on r (both in set)

D) Π^{S_2} = {p, r} is an answer set because
    it's minimal and its consistent with no
    contradictory

E) Excluding candidates that contain literals is motivated to avoid contradictory or inconsistent information. These lits would conflict with the rules given in the program

2)

A) ① $\{\}$ ② $\{p\}$ ③ $\{r\}$ ④ $\{\neg p\}$ ⑤ $\{\neg r\}$ ⑥ $\{p, r\}$ ⑦ $\{\neg p, \neg r\}$
⑧ $\{p, \neg r\}$ ⑨ $\{\neg p, r\}$ ⑩ $\{p, r, \neg p, \neg r\}$ ⑪ $\{p, \neg p\}$
⑫ $\{r, \neg r\}$ ⑬ $\{p, r, \neg p\}$ ⑭ $\{p, r, \neg r\}$
⑮ $\{\neg r, \neg p, p\}$ ⑯ $\{\neg p, \neg r, r\}$

B) $\neg p$ or r
$\neg p \leftarrow \neg p$

- candidate set $S_1 = \{p = F, r = T\}$
  1) $\checkmark$ $\neg p$ or r : $\neg F$ or T evaluates to T
     $\checkmark$ $\neg p \leftarrow \neg p$: $\neg F$ evaluates to T
  Reduct:
  $$\Pi s' = \{\neg p\}$$

3) $p \leftarrow r$, not s
   $s \leftarrow$ not p

   canidate set $S_1 = \{s\}$
   1) $p \leftarrow r$, not s, this rule gets canceled because (of answer set negati...)
   2) $s \leftarrow$ not p, s is true because p not in set.
   Relevant Reduct $\Pi s' = \{s\}$
      this is an answer set of S_1

4) $A_1 = \{p(a), \neg p(b), r, s, \neg t\}$
   $A_2 = \{p(a), \neg s, \neg t\}$

a) $\neg p(a)$ is not present in A_1 and A_2, so the query
   is false
b) $\neg p(b)$ is present in A_1, $\neg p$ is not present in A_2
   Therefore the query is unknown.
c) (s) is present in A_1, (s) is not present in A_2
   Therefore, (s) is unknown
d) $t \wedge \neg s$ is not present in BOTH queries
   Therefore, the answer is false
e) $\neg t \vee s$ is present in A_1, $\neg t \vee s$ is present
   in A_2
   Therefore, the answer is True

5) Rewrite Rule 2)
   − pursue(x) ← expedient(x), not meaningful(x)