1. *a)* Irreversible, since it is impossible to return the egg to its raw state.

   b) Irreversible, since the dissolved metal cannot become solid again.

   c) Reversible, since there is the simultaneous presence of salt in its aqueous form and its solid form.

   d) Reversible, since the ($CO_{2(g)}$) dissolved in the champagne and the gaseous carbon dioxide that occupies the space between the champagne and the cork are constantly changing from one to the other.

2. *a)* Open

   b) Closed

   c) Closed

   d) Closed, if the bottle is closed.

   e) Open

   f) Open

3. Since this system is open, it does not allow the simultaneous presence of reactants and products. In fact, the constant supply of oxygen (O_2) continuously favours the direct reaction. Moreover, since the product molecules are in the gas phase, they dissipate rapidly in the ambient air and their disappearance also favours the direct reaction.

5. *a)* This system is not in a state of equilibrium, since it is an open system.

   b) This system is in a state of equilibrium. It is solubility equilibrium.

   c) This system is not in a state of equilibrium, since it is not a closed system. In fact, in this particular case, this system is in a stationary state: the water entering the system is equivalent to the water leaving the system.

   d) This system is in a state of equilibrium. It is phase equilibrium.

   e) This system is in a state of equilibrium. It is chemical equilibrium.

8. Yes, this vinegar solution could have attained equilibrium. There is no residue since it is not a solid compound that is being dissolved. The presence of a residue is observed in the system only if a compound in the solid state is being dissolved.