Question:

1 : Calculate the standard entropy change for the following reaction,

2Ag2O(s)→4Ag(s)+O2(g);

given S_o[Ag2O] = 121.3 J/K·mol, S_o[Ag(s)] = 42.6 J/K·mol, and S_o[O2(g)] = 205.1 J/K·mol.
-126.4 J/K
+126.4 J/K
-205.1 J/K
+132.9 J/K
Question 2 : A statement of the second law of thermodynamics is that
the enthalpy of reaction is the difference between product and reactant enthalpies.
energy is conserved in a chemical reaction.
spontaneous reactions are always exothermic.
the entropy of the universe is continually increasing.

Solution:

Question 1: The standard entropy change is calculated by the following formula:

$$\Delta S_{0,r} = \sum S_{products} - \sum S_{reference}$$

$$\Delta S_{o,r} = 4 \cdot 42.6 + 205.1 - 2 \cdot 121.3 = 132.9 \, J/K$$

So the correct answer: +132.9 J/K.

Question 2: The second law of thermodynamics: heat itself passes from a higher temperature body to a body with a lower temperature and can not spontaneously move backward. Or there is another formulation: all spontaneous processes in nature are going to increase in entropy. So the correct answer: the entropy of the universe is continually increasing.

Answer: Question 1: +132.9 J/K;

Question 2: the entropy of the universe is continually increasing.