1. Yes, an imaginary image may be photographed. Even more, on the photo it won't differ in any parameter from a real image. For a camera or an eye or any other watching mechanism it's important for the rays to reach the detector, no matter on their pre-history.

2. As at the given temperature the gases don't interact, their temperature will stay 300 K. But for the entropy the question is more complicated. Using the definition $dS = dQ/T$ we can conclude that the entropy won't change. Though, the system will anyway reach the situation when both gases are in equal proportions. If there's N molecules of each gas (obviously, equal for both gases), then both gases set free 2^N situations of the molecules distribution. So, the entropy has changed by $\Delta S = 2kN = 2\nu R$, where $\nu = pV/(2RT)$ is the amount of substance of each gas. Then for the entropy we have

$$\Delta S = \frac{pV}{T} = 0.68 \text{ J/K}.$$

3. This problem is discussed in the book "Problems in physics"[1], its number is 11.2.13 and the answer is

$$\mathcal{E} = \frac{\pi h^2}{3} N^3 B_0 \omega \sin \omega t.$$

4. The work done on the gas (on both processes) is

$$A = \nu R T_1 \ln \frac{V_1}{V_2} - \frac{\nu R T_2}{\gamma - 1} \left(1 - 2^{\gamma - 1}\right),$$

where ν is the amount of substance of the gas. The heat taken from the gas is

$$Q = \nu R T_1 \ln \frac{V_1}{V_2}.$$

As $pV^\gamma = const$, then $TV^{\gamma-1} = const$, and

$$T_f = \frac{T_i}{2^{\gamma-1}} = 227 \text{ K}.$$

5. Detected an attempt to measure heat capacity (usually J/K) in a dimensionless quantity $3N/2$. Fatal error, aborting..

[1] *И. Воробьев, П. Зубков и др. (под ред. О. Я. Савченко)* "Задачи по физике", *НГУ, Новосибирск, ISBN* 5-86134-024-2