

Answer - 7 \Rightarrow

given, Mass explodes and changes to black hole.

Let Radius of black hole = R

Radius of Mass = R_m

given, $R = 10^5 \times R_m$

Using Bekenstein - Hawking relation,
Entropy generated = S is

$$S = \frac{\text{Area of black hole}}{(\text{Planck's length})^2} \times a$$

~~$a = \frac{k_B}{4}$~~ Boltzmann constant
 $a = \frac{k_B}{4} = 3.45 \times 10^{-24} \text{ J/K}$

now, Planck's length = $P_L = 10^{-35} \text{ m}$

$$\text{Area of black hole} = 4\pi R^2 = 4\pi (10^5 R_m)^2$$

$$\text{now, } S = \frac{4\pi \times 10^{10} \times R_m^2}{(10^{-35})^2} \times a = a \times 4\pi R_m^2 \times 10^{80} \text{ J/K}$$

~~assuming $a = 1$~~ , take $R_m = 3.3895 \times 10^6 \text{ m}$

$$\text{we get } S = 1.444 \times 10^{94} \times 3.45 \times 10^{-24} \text{ J/K}$$

S , is entropy generated by black hole.

$$\boxed{S = 4.987 \times 10^{70} \text{ J/K}}$$