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10. A solid body of constant heat capacity  $1 \text{ J/}^\circ\text{C}$  is being heated by keeping it in contact with reservoirs in two ways:

(i) Sequentially keeping in contact with 2 reservoirs such that each reservoir supplies same amount of heat.

(ii) Sequentially keeping in contact with 8 reservoirs such that each reservoir supplies same amount of heat. In both the cases body is brought from initial temperature  $100^\circ\text{C}$  to final temperature  $200^\circ\text{C}$ . Entropy changes of the body in the two cases respectively is

(1)  $\ln 2, 4\ln 2$

(2)  $\ln 2, \ln 2$

(3)  $\ln 2, 2\ln 2$

(4)  $2\ln 2, 8\ln 2$

**Answer:** We know that similar to internal energy and enthalpy, entropy is also a state function, so entropy does not depend on how the process is carried out or how the system arrived at the state. Since initial and final temperature (state) remains same in both the process hence entropy will also be same.

**Correct choice is (2)  $\ln 2, \ln 2$**