Previous year JEE questions 9

When one mole of monoatomic ideal gas at T K undergoes adiabatic change under a constant external pressure of 1 atm volume changes from 1 litre to 2 litre. The final temperature in Kelvin would be *(2005S)*

(a) $\dfrac{T}{2^{(2/3)}}$

(b) $T + \dfrac{2}{3}\times 0.0821$

(c) T

(d) $T - \dfrac{2}{3}\times 0.0821$

(a) $TV^{\gamma-1} = $ Constant   ($\because$ change is adiabatic)

$$T_1 V_1^{\gamma-1} = T_2 V_2^{\gamma-1}$$

For monoatomic gas $\gamma = \dfrac{5}{3}$

$$\therefore\ T_1 V_1^{2/3} = T_2 V_2^{2/3} \Rightarrow T(1)^{2/3} = T_2(2)^{2/3}$$

$$T_2 = \dfrac{T}{2^{(2/3)}}$$