Assignment

Q) A cylinder of fixed capacity 44.8 litres contains Helium gas at standard temperature and pressure. What is the amount of heat needed to raise the temperature of the gas in the cylinder by 15 ^{0}C.

A) Since one mole of any ideal gas at STP occupies a volume of 22.4 here Therefore, cylinder of fixed capacity 44.8 litre must contain 2 moles of helium at STP.

For helium, $C_V = \dfrac{3}{2} R$(monatomic)

∴ Heat needed to raise the temperature, Q= number of moles × molar specific heat × raise in temperature.

$$= 2 \times \frac{3}{2} R \times 15 = 45R = 45 \times 8.31 J = 373.95$$

J