**2.** The amount of heat needed to raise the temperature of 4 moles of a rigid diatomic gas from 0°C to 50°C when no work is done is _____. (R is the universal gas constant)

[July 20, 2021 (I)]

(a) 250 R

(b) 750 R

(c) 175 R

(d) 500 R

**ans** (d) Given,

Change in temperature,

$\Delta T = 50K$

Specific heat at constant volume for diatomic gas,

$$C_v = \frac{5R}{2}$$

As work done = 0. It means the process is isochoric

Using first law of thermodynamics, $Q = \Delta U + W$

$\Rightarrow Q = \Delta U$

$= nC_v\Delta T = 4 \times \frac{5R}{2} \times 50 = 500R$