

4. For silver, $C_p(\text{J K}^{-1} \text{ mol}^{-1}) = 23 + 0.01 T$. If the temperature (T) of 3 moles of silver is raised from 300 K to 1000 K at 1 atm pressure, the value of ΔH will be close to :

A) 62 kJ

B) 16 kJ

C) 13 kJ

D) 21 kJ

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Ans: A) 62 kJ

$$n = 3$$

$$T_1 = 300$$

$$T_2 = 1000$$

$$C_p = 23 + 0.01T$$

We know,

$$\Delta H = \int_{T_1}^{T_2} nC_p dT$$

$$= \int_{300}^{1000} 3(23 + 0.01T) dT$$

$$= 3[23T + T^2/200]$$

$$= 3[23(1000 - 300) + (1/200) \{(1000)^2 - (300)^2\}]$$

$$= 61950 \text{ J}$$

$$= 61.95 \text{ kJ}$$

$$\approx 62 \text{ kJ}$$