



## DPP-3 [Heat Capacity]

Assignment boring lagta hai? Yaad rakho — Naruto ki training bhi boring thi, lekin wahi boring practice ne usko Hokage banaya.”

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- Q1.** 5 moles of oxygen are heated at constant volume from  $10^{\circ}\text{C}$  to  $20^{\circ}\text{C}$ . What will be the change in the internal energy of gas? The molar heat capacity of oxygen at constant pressure,  $C_p = 7.03 \text{ cal mol}^{-1}\text{K}^{-1}$  and  $R = 2 \text{ cal mol}^{-1}\text{K}^{-1}$ .
- Q2.** A gas expands from  $3 \text{ dm}^3$  to  $5 \text{ dm}^3$  against a constant pressure of 3 atm. The work done during expansion is used to heat 10 mol of water of temperature 290 K. Calculate final temperature of water (if specific heat of water is  $4.184 \text{ J g}^{-1}\text{K}^{-1}$ ).
- Q3.** Calculate the amount of heat required to raise the temperature of 13.5 g aluminium from 300 K to 400 K, if specific heat of aluminium is  $0.9 \text{ J } (^{\circ}\text{C})^{-1} \text{ g}^{-1}$ .
- Q4.** When 229 J of energy is supplied as heat at constant pressure to 3 mol Ar(g), the temperature of the sample is increased by 2.55 K. Calculate the molar heat capacity at constant volume:
- (a)  $30 \text{ kJ K}^{-1} \text{ mol}^{-1}$
  - (b)  $30 \text{ J K}^{-1} \text{ mol}^{-1}$
  - (c)  $21.7 \text{ J K}^{-1} \text{ mol}^{-1}$
  - (d)  $21.7 \text{ kJ K}^{-1} \text{ mol}^{-1}$
- Q5.** The correct relation between molar heat capacities  $C_p$  and  $C_v$  is
- (a)  $C_p + C_v = R$
  - (b)  $C_p - C_v = 2R$
  - (c)  $C_p - C_v = R$
  - (d)  $C_p - C_v = \frac{R}{2}$
- Q6.** The specific heat of a gas is found to be 0.075 calories/g K at constant volume and its formula wt is 40. The atomicity of the gas would be
- (a) One
  - (b) Two
  - (c) Three
  - (d) Four
- Q7.** Specific heat at constant volume ( $C_v$ ) of a monoatomic gas is
- (a)  $\frac{3}{2}R$
  - (b)  $\frac{5}{2}R$
  - (c)  $\frac{7}{5}R$
  - (d)  $\frac{4}{3}R$
- Q8.** Molar heat capacity of water in equilibrium with ice at constant pressure is
- (a) Zero
  - (b) Infinity
  - (c)  $40.45 \text{ kJ K}^{-1} \text{ mol}^{-1}$
  - (d)  $75.48 \text{ J K}^{-1} \text{ mol}^{-1}$

- Q9.** A closed flask contains a substance in all its three states, solids, liquids and vapour at its triple point. In this situation the average KE of the water molecule will be
- Maximum in vapour state
  - Maximum in solid state
  - Greater in the liquid than in vapour state
  - Same in all the three states
- Q10.** The difference between the value of  $C_p$  of  $H_2$  and  $C_v$  of He will be
- R
  - 2R
  - 3R
  - 4R
- Q11.** Which of the following can be correct?
- $\Delta H - \Delta U = nR\Delta T$
  - $C_p - C_v = R$
  - $\left. \frac{dU}{dT} \right|_V - \left. \frac{dH}{dT} \right|_P = R$
  - All of these
- Q12.** Volume of gas is doubled from its original volume. The specific heat will be
- Reduced to half
  - Doubled
  - Remain same
  - Increased four times
- Q13.**  $5.6 \text{ dm}^3$  of gas at STP requires 52.25 J of heat to raise its temperature by  $10^\circ\text{C}$  at constant volume. Gas can be
- He
  - $H_2$
  - $\text{NO}_2$
  - $\text{CO}_2$
- Q14.** For one mole of an ideal gas ( $C_p$  and  $C_v$  are molar heat capacities at constant pressure and constant volume respectively):
- $C_p - C_v = R$
  - $C_p - C_v = \frac{R}{2}$
  - $C_p - C_v = -2R$
  - $C_p - C_v = 0$