Physicsaholics

DPP – 3

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Q 1. The pressure of the gas filled in thermally insulated container is P and temperature is T. If the ratio of specific heats of the gas is g, which of the following will be constant

(a) $PT^{\gamma-1}$ (b) $P^{\gamma}T^{1-\gamma}$

(c) $P^{1-\gamma}T^{\gamma}$ (d) $P^{-\gamma}\ T^{\gamma-1}$

Q 2. The ratio of slopes of adiabatic and isotherm at point of intersection is-

(a) 1 : γ (b) 1 : 1

(c) γ : 1 (d) 1 : 4

Q 3. In an adiabatic expansion of a gas, its temperature -

(a) always increases (b) always decreases

(c) remains constant (d) diminishes initially and then increases

Q 4. In an adiabatic process, temperature of a gas is doubled by compression, the final pressure will be -

(a) doubled

(b) more than double

(c) less than double

(d) much greater than double

Q 5. The pressure and volume of a gas are P and V. If its pressure is reduced to P/2, by (A) isothermal process (B) by adiabatic process then the final volume will be -

(a) more in A

(b) more in B

(c) equal in A and B

(d) depends on the nature of gas

Q 6. In adiabatic expansion

(a) $\Delta U = 0$ (b) $\Delta U = negative$

(c) $\Delta U = positive$ (d) $W = zero$

Q 7. In an adiabatic expansion of one mole gas initial and final temperatures are T_1 and T_2 respectively, then the change in internal energy of the gas is (symbols have their usual meaning)

(a) $\frac{R}{\gamma-1}(T_2 - T_1)$ (b) $\frac{R}{\gamma-1}(T_1 - T_2)$

(c) $R(T_1 - T_2)$ (d) zero

Q 8. Two moles of an ideal monoatomic gas at 27°C occupies a volume of V. If the gas is expanded adiabatically to the volume 2V, then the work done by the gas will be [γ = 5/3, R = 8.31 J/mol K

(a) -2767.23J (b) 2767.23J

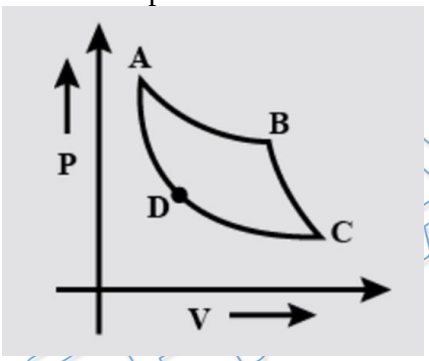
(c) 2500 J (d) $-2500\ J$

Q 9. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The adiabatic constant of gas is

(a) 3/2 (b) 4/3

(c) 2 (d) 5/3

Q 10. In given P-V graph of an ideal gas two processes are isothermal and two are adiabatic, which parts describe the adiabatic process :



(a) AB and BC (b) AB and CD

(c) AD and BC (d) None of these

Q 11. A gas at NTP is suddenly compressed to one-fourth of its original volume. If γ is supposed to be $\frac{3}{2}$, then the final pressure is

(a) 4 atmosphere (b) $\frac{3}{2}$ atmosphere

(c) 8 atmosphere (d) $\frac{1}{4}$ atmospher

Q 12. The pressure in the tyre of a car is four times the atmospheric pressure at 300 K. If this tyre suddenly bursts, its new temperature will be (γ = 1.4)

(a) $300(4)^{1.4/0.4}$ (b) $300\left(\frac{1}{4}\right)^{-0..4/1.4}$

(c) $300(2)^{-0.4/1.4}$ (d) $300(4)^{-0.4/1.4}$

Answer Key

Q.1 c	**Q.2 c**	**Q.3 b**	**Q.4 b**	**Q.5 a**
Q.6 b	**Q.7 a**	**Q.8 b**	**Q.9 a**	**Q.10 c**
Q.11 c	**Q.12 d**			