



Video Solution on Website:-

<https://physicsaholics.com/home/courseDetails/57>

Video Solution on YouTube:-

<https://youtu.be/R21yaok6WpQ>

Written Solution on Website:-

<https://physicsaholics.com/note/notesDetailis/32>

- Q 1. Calculate the total number of degree of freedom for a mole of diatomic gas at STP
(a) 30.10×10^{23} (b) 3.10×10^{23}
(c) 12.24×10^{20} (d) 3.14×10^{17}
- Q 2. At what temperature, the kinetic energy of a gas molecule is half of the value at 27°C ?
(a) 123°C (b) 123 K (c) -123 K (d) -123°C
- Q 3. The number of degrees of freedom for a rigid diatomic molecule is
(a) 3 (b) 5 (c) 6 (d) 7
- Q 4. The energy associated with each degree of freedom of a molecule
(a) $\frac{1}{2}RT$ (b) $\frac{1}{2}kT$ (c) $\frac{3}{2}RT$ (d) $\frac{3}{2}kT$
- Q 5. A polyatomic gas with (n) degree of freedom has a mean energy per molecule given by
(a) $\frac{n}{2}RT$ (b) $\frac{1}{2}RT$ (c) $\frac{n}{2}kT$ (d) $\frac{1}{2}kT$
- Q 6. The number of degrees of freedom of molecules of argon gas is
(a) 1 (b) 3 (c) 5 (d) 7
- Q 7. Helium gas is filled in a closed vessel (having negligible thermal expansion coefficient) when it is heated from 300 K to 600 K, then average kinetic energy of helium atom will be
(a) $\sqrt{2}$ times (b) 2 times (c) unchanged (d) half
- Q 8. The average rotational kinetic energy of hydrogen molecule at a temperature T is E. The average translational kinetic energy of helium at same temperature will be:
(a) $\frac{2E}{3}$ (b) $\frac{5E}{3}$ (c) E (d) $\frac{3E}{2}$
- Q 9. The average translational energy and the rms speed of molecules in a sample of oxygen gas at 300 K are $6.21 \times 10^{-21}\text{J}$ and 484m/s respectively The corresponding values at 600 K are nearly (assuming ideal gas behavior)
(a) $12.42 \times 10^{-21}\text{J}$, 928 m/s (b) $8.78 \times 10^{-21}\text{J}$, 684 m/s
(c) $6.21 \times 10^{-21}\text{J}$, 968 m/s (d) $12.42 \times 10^{-21}\text{J}$, 684 m/s



- Q 10. One kg of a diatomic gas is at a pressure of $8 \times 10^4 \text{ N/m}^2$. The density of the gas is 4 kg/m^3 . What is the energy of the gas due to its thermal motion?
(a) $5 \times 10^4 \text{ J}$ (b) $6 \times 10^4 \text{ J}$ (c) $7 \times 10^4 \text{ J}$ (d) $4 \times 10^4 \text{ J}$
- Q 11. The average kinetic energy of H_2 molecules at 300K is E at the same temperature the average kinetic energy of O_2 molecules is:
(a) E (b) $\frac{E}{4}$ (c) $\frac{E}{16}$ (d) $16E$

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Answer Key

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