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PHYSICS · EAPCET (EAMCET)

Kinetic Theory of Gases

Previous Year Questions with answers

163 questions · **132** papers · **2011–2026** · newest paper first

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What is in this PDF: every Kinetic Theory of Gases question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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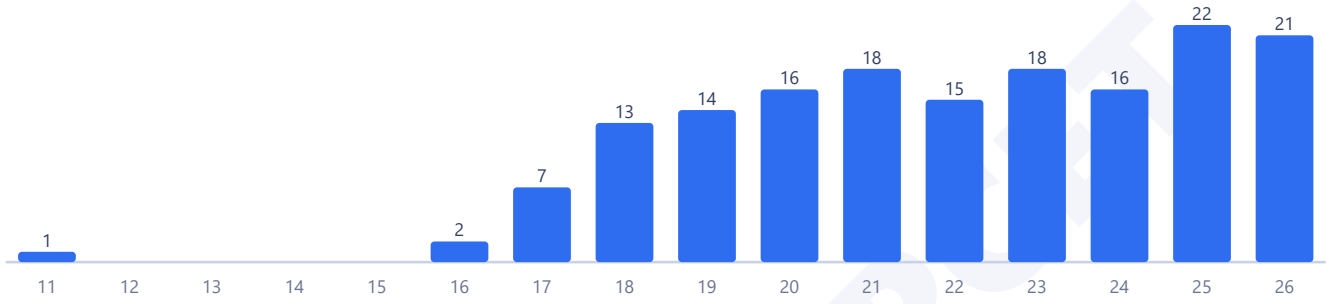
Chapter at a glance

3%	163	74 of 77	163 / 0
of Physics questions, 2022–2026	questions, 2011–2026	papers asked it, 2022–2026	MCQ / numerical, 2011–2026

Trend. Steady: 1.3 questions per paper in 2024–2026 against 1.1 in 2022–2023.

Questions per year



Counts are the questions we hold: 163 in 132 papers. 2 questions in this chapter came back in more than one paper.

Most-asked topics in this chapter (2011–2026)

Degrees of Freedom & Specific Heats	60
Gas Laws & Kinetic Model	56
Molecular Speeds	47

How often it comes up

Kinetic Theory of Gases forms an essential quantitative bridge between molecular mechanics and thermodynamics in Class 11 physics. In the papers we hold for AP and TS EAPCET from 2022 to 2026, the chapter contributed 92 questions across 77 papers. That gives an average frequency of 1.2 questions per paper, accounting for 3.0% of all physics questions in that recent window. Looking across all years in our archive from 2010 to 2026, Kinetic Theory of Gases yielded 163 questions across 149 papers, maintaining an average of 1.1 questions per paper and a 2.7% subject share. Across the earlier window from 2010 to 2021, our archive contains 71 questions across 72 papers (2.5% share). In the last three exam years from 2024 to 2026, the chapter supplied 59 questions across 46 papers, registering a 3.2% share. Comparing the last three years to early papers, the chapter's share of the subject is up, while compared to the recent five-year window it is about the same.

State-level distributions reflect active presence in both examination streams. AP EAPCET papers between 2022 and 2026 delivered 62 questions across 48 papers in our set, with 47 papers including at least one question (1.3 per paper, 3.2% share). Over the same timeframe, TS EAPCET provided 30 questions across 29 papers in our set, with 27 papers containing questions (1.0 per paper, 2.6% share). Kinetic Theory of Gases has appeared every year since 2022, though across all 77 recent papers in our collection, three papers missed it, so it was not present in all 77 sittings. The chapter ranks 17th of 28 physics chapters by question share between 2022 and 2026. The busiest single sitting in our collection was 2025, which featured 22 questions across 16 papers.

Most-asked topics

Questions group into three main theoretical themes:

- **Degrees of Freedom & Specific Heats**: 39 questions were asked between 2022 and 2026, contributing to an all-time archive total of 60 questions. This leading area tests equipartition of energy, degrees of freedom for

monoatomic, diatomic, and polyatomic molecules, molar heat capacities C_v and C_p, and equivalent ratios for gaseous mixtures.

- **Gas Laws & Kinetic Model**: Recent papers contributed 29 questions, out of 56 questions across all years in our archive. It tests the ideal gas equation P V = n R T, gas escape from rigid containers, Dalton's law of partial pressures, pressure exerted by molecular bombardment, and mean free path.
- **Molecular Speeds**: A steady pool of 24 questions appeared in the recent five-year window, out of 47 questions across the entire archive. This section focuses on root-mean-square speed, average speed, most probable speed, and their dependence on absolute temperature and molar mass.

What the questions look like

A signature numerical question gives two different gases at distinct temperatures and asks for the ratio of their root-mean-square molecular speeds. For example, comparing helium at a moderate temperature with oxygen at a elevated temperature requires evaluating the square root of (T_1 M_2 / T_2 M_1). Another frequent variant asks for the temperature at which the rms speed of one gas equals the rms speed or most probable speed of another.

Problems on gas mixtures are equally common. Students are given specified mole numbers of two gases, such as helium and oxygen, and must determine the mixture's effective molar heat capacity C_v, equivalent specific heat ratio γ, or internal energy. Container escape problems also feature regularly, asking for the mass or fraction of gas expelled when a rigid cylinder experiences a measured pressure drop at constant temperature.

How to practise it

Start by memorizing the fundamental molecular speeds and their proportionality: v_rms = √(3 R T / M), average speed v_avg, and v_mp = √(2 R T / M). Notice that all three speeds scale directly with √(T / M). The order of speeds follows v_mp < v_avg < v_rms, which helps to quickly verify ratio problems.

Next, master the equipartition theorem. Each degree of freedom contributes (1/2) k_B T of translational or rotational kinetic energy per molecule, and (1/2) R T of internal energy per mole. For a monoatomic gas with three degrees of freedom, C_v = (3/2) R and C_p = (5/2) R, giving γ = 5/3. For a rigid diatomic gas with five degrees of freedom, C_v = (5/2) R and C_p = (7/2) R, giving γ = 7/5 = 1.4.

For mixtures containing n_1 moles of gas 1 and n_2 moles of gas 2, always compute C_v(mix) = (n_1 C_v1 + n_2 C_v2) / (n_1 + n_2) first. Then find C_p(mix) = C_v(mix) + R, and finally compute γ(mix) = C_p(mix) / C_v(mix). Avoid taking a weighted average of γ directly, as γ is a non-linear ratio.

Finally, review the mean free path formula λ = 1 / (√2 n π d^2), where n is the number density of molecules and d is molecular diameter. Note how λ varies inversely with pressure at constant temperature.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

The translational kinetic energy of the molecule of 22 grams of CO_2 at $27^\circ C$ is
(Universal gas constant $R = 8.314\, J\, mol^{-1}\, {}^\circ C^{-1}$)

(A) 1870.6 J
(B) 164.7 J
(C) 2000 J
(D) 2200 J

Answer: (A) 1870.6 J · The council's preliminary key

Q2 AP EAPCET 2026 · 18 May · Shift 2 MCQ

Internal energy of an ideal gas depends only on

(A) P
(B) V
(C) T
(D) P and T

Answer: (C) T · The council's preliminary key

Q3 AP EAPCET 2026 · 18 May · Shift 2 MCQ

The ratio of velocity of sound to the rms velocity of gas molecules in a diatomic gas is

(A) $\sqrt{9/5}$
(B) $\sqrt{5/9}$
(C) $\sqrt{7/15}$
(D) $\sqrt{15/7}$

Answer: (C) $\sqrt{7/15}$ · The council's preliminary key

Q4 AP EAPCET 2026 · 15 May · Shift 1 MCQ

The approximate temperature at which the rms speed of Nitrogen gas molecule is $500\ ms^{-1}$
Gas constant $R = 8.314\ J\ mol^{-1}K^{-1}$,
Mass number of Nitrogen $= 28$

(A) $280\ K$
(B) $300\ K$
(C) $350\ K$
(D) $250\ K$

Answer: (A) $280\ K$ · The council's preliminary key

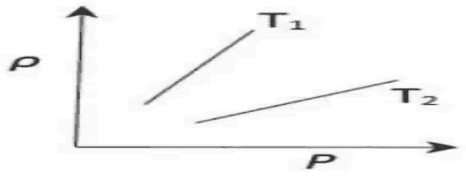
Q5 AP EAPCET 2026 · 15 May · Shift 2 MCQ

The density (ρ) versus pressure (P) of a given mass of an ideal gas is shown at two temperatures T_1 and T_2. The relation between T_1 and T_2 is

(see the figure above)

The density (ρ) versus pressure (P) of a given mass of an ideal gas is shown at two temperatures T_1 and T_2. The relation between T_1 and T_2 is

T_1 మరియు T_2 ఉష్ణోగ్రతల వద్ద స్థిర ద్రవ్యరాశి గల ఒక ఆదర్శ వాయువు యొక్క సాంద్రత (ρ) మరియు పీడనం (P) గ్రాఫ్ లో చూపిన విధంగా ఉంటే, T_1 మరియు T_2 ల మధ్య సంబంధం



Options :

1. $T_1 > T_2$
2. $T_2 > T_1$
3. $T_1 = T_2$
4. $T_1 > T_2$ or $T_2 > T_1$
   $T_1 > T_2$ లేదా $T_2 > T_1$

(A) $T_1 > T_2$
(B) $T_2 > T_1$
(C) $T_1 = T_2$
(D) $T_1 > T_2$ or $T_2 > T_1$

Answer: (B) $T_2 > T_1$ · The council's preliminary key

Q6 AP EAPCET 2026 · 14 May · Shift 1 MCQ

The temperature at which the rms speed of hydrogen molecules is equal to that of oxygen molecules at $47^{\circ}\mathrm{C}$ is

(A) $20\ K$
(B) $80\ K$
(C) $73\ K$
(D) $3\ K$

Answer: (A) $20\ K$ · The council's preliminary key

Q7 AP EAPCET 2026 · 14 May · Shift 2 MCQ

An ideal gas is expanding such that P^2T = constant. The coefficient of volume expansion of the gas is (P- Pressure, T- temperature of the gas)

(A) $\frac{1}{T}$
(B) $\frac{2}{T}$
(C) $\frac{3}{T}$
(D) $\frac{3}{2T}$

Answer: (D) $\frac{3}{2T}$ · The council's preliminary key

Q8 AP EAPCET 2026 · 14 May · Shift 2 MCQ

Two moles of Helium are mixed with 'n' moles of Hydrogen. The rms speed of the gas molecules in the mixture is $\sqrt{2}$ times the speed of sound in the mixture. The value of 'n' is

(A) 1
(B) 3
(C) 2
(D) 3/2

Answer: (C) 2 · The council's preliminary key

Q9 AP EAPCET 2026 · 13 May · Shift 1 MCQ

The rms speed of oxygen molecule at some temperature is $150\ \text{ms}^{-1}$. Then the rms speed of hydrogen molecule at the same temperature is

(A) $400\ \text{ms}^{-1}$
(B) $600\ \text{ms}^{-1}$
(C) $200\ \text{ms}^{-1}$
(D) $800\ \text{ms}^{-1}$

Answer: (B) $600\ \text{ms}^{-1}$ · The council's preliminary key

Q10 AP EAPCET 2026 · 13 May · Shift 2 MCQ

The Mean free path of a gas molecule, whose diameter is 2×10^{-10} m is 1.6×10^{-7} m. Calculate the mean free path of another gas molecule whose diameter is 4×10^{-10} m (under the same conditions)

(A) 0.4×10^{-7} m
(B) 0.8×10^{-7} m
(C) 6.4×10^{-7} m
(D) 1.6×10^{-7} m

Answer: (A) 0.4×10^{-7} m · The council's preliminary key

Q11 AP EAPCET 2026 · 12 May · Shift 1 MCQ

An ideal gas of density 'ρ' is enclosed in a vessel of volume V at 0°C temperature and p_0 atmospheric pressure. If the pressure inside the vessel decreased by Δp due to a leakage. The mass of the leaked out gas is

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(A) $V.\rho.p_0$
(B) $V\rho/p_0$
(C) $V\Delta\rho/p$
(D) $\frac{V.\rho.\Delta p}{p_0}$

Answer: (D) $\frac{V.\rho.\Delta p}{p_0}$ · The council's preliminary key

Q12 AP EAPCET 2026 · 12 May · Shift 1 MCQ

If the ratio of specific heats of a gas is 1.4, then the gas is

(A) Monoatomic
(B) Diatomic
(C) Triatomic
(D) Polyatomic

Answer: (B) Diatomic · The council's preliminary key

Q13 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A vessel contains a mixture of nitrogen of mass 7 g and carbondioxide of mass 11 g at a temperature 290 K and pressure 1 atm. The density of the mixture is

(A) $1.1\ \mathrm{g\,L^{-1}}$
(B) $1.2\ \mathrm{g\,L^{-1}}$
(C) $1.515\ \mathrm{g\,L^{-1}}$
(D) $1.6\ \mathrm{g\,L^{-1}}$

Answer: (C) $1.515\ \mathrm{g\,L^{-1}}$ · The council's preliminary key

Q14 AP EAPCET 2026 · 12 May · Shift 2 MCQ

If the temperature of 3 moles of helium gas is increased by 2K, then the change in the internal energy of helium gas is

(A) 70.0 J
(B) 68.2 J
(C) 74.8 J
(D) 78.2 J

Answer: (C) 74.8 J · The council's preliminary key

Q15 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If the average kinetic energy of the molecules of a gas at a temperature of 30 °C is U, then the temperature at which the average kinetic energy of the molecules of the gas becomes 2U is

(A) 939 °C
(B) 303 °C
(C) 333 °C
(D) 60 °C

Answer: (C) 333 °C · The council's preliminary key

Q16 TS EAPCET 2026 · 11 May · Shift 2 MCQ

An air bubble rises from the bottom of a lake of depth 37 m. The temperature of the lake is constant from the bottom to the top and atmospheric pressure is equal to the pressure 10 m of water column. The percentage increase in the volume of the bubble when it rises from a depth of 20 m to a depth of 15 m is

(A) 25
(B) 10
(C) 20
(D) 30

Answer: (C) 20 · The council's preliminary key

Q17 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If the molar specific heat of a rigid diatomic gas at constant pressure is C, then the molar specific heat of a monoatomic gas at constant volume is

(A) $\frac{2C}{5}$
(B) $\frac{3C}{5}$
(C) $\frac{5C}{7}$
(D) $\frac{3C}{7}$

Answer: (D) $\frac{3C}{7}$ · The council's preliminary key

Q18 TS EAPCET 2026 · 10 May · Shift 1 MCQ

The ratio of rms speeds of helium gas molecules at a temperature of $127\ ^{\circ}\mathrm{C}$ and oxygen gas molecules at a temperature of $527\ ^{\circ}\mathrm{C}$ is
(Molar masses of helium and oxygen gases are 4 and 32 respectively)

(A) $\sqrt{2} : 1$
(B) $4 : 1$
(C) $2 : 1$
(D) $\sqrt{8} : 1$

Answer: (C) $2 : 1$ · The council's preliminary key

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Q19 TS EAPCET 2026 · 10 May · Shift 2 MCQ

The thermodynamic variable on which the average kinetic energy of a gas molecule depends is

(A) Temperature
(B) Pressure
(C) Volume
(D) Density

Answer: (A) Temperature · The council's preliminary key

Q20 TS EAPCET 2026 · 9 May · Shift 1 MCQ

A vessel of volume 2000 cc is filled with 5 moles of an ideal gas at a temperature of $127\,^{\circ}\mathrm{C}$. The total kinetic energy of the gas in the vessel is
(R – Universal gas constant)

(A) $6000R$
(B) $3000R$
(C) $1000R$
(D) $1500R$

Answer: (B) $3000R$ · The council's preliminary key

Q21 TS EAPCET 2026 · 9 May · Shift 2 MCQ

5 moles of monoatomic gas and one mole of rigid diatomic gas are mixed. The internal energy (in kJ) of the gaseous mixture at a temperature of 127 °C is

(Universal gas constant $= 8.31\ \mathrm{J\,mol^{-1}\,K^{-1}}$)

(A) 66.48
(B) 49.86
(C) 16.62
(D) 33.24

Answer: (D) 33.24 · The council's preliminary key

Q22 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If a gaseous mixture consists of 3 moles of oxygen and 4 moles of argon at an absolute temperature T, then the total internal energy of the mixture is (neglect vibrational modes and R - Universal gas constant)

(A) 11RT
(B) 12.5RT
(C) 13.5RT
(D) 15.5RT

Answer: (C) 13.5RT · The council's preliminary key

Q23 AP EAPCET 2025 · 26 May · Shift 1 MCQ

To increase the rms speed of gas molecules by 25%, the percentage increase in absolute temperature of the gas is to be

(A) 42.75
(B) 56.25
(C) 36.75
(D) 18.25

Answer: (B) 56.25 · The council's preliminary key

Q24 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If the ratio of universal gas constant and specific heat capacity at constant volume of a gas is given by 0.67, then the gas is

(A) monoatomic
(B) diatomic
(C) polyatomic
(D) a mixture of diatomic and polyatomic gases

Answer: (A) monoatomic · The council's preliminary key

Q25 AP EAPCET 2025 · 26 May · Shift 2 MCQ

The internal energy of 4 moles of a monoatomic gas at a temperature of 77 °C is

(R - Universal gas constant)

(A) $1500R$
(B) $1800R$
(C) $2100R$
(D) $3500R$

Answer: (C) $2100R$ · The council's preliminary key

Q26 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If the rms speed of the molecules of a diatomic gas at a temperature of 322 K is 2000 m s^{-1}, then the gas is

(Universal gas constant = 8.31 J mol^{-1} K^{-1})

(A) hydrogen
(B) nitrogen
(C) oxygen
(D) chlorine

Answer: (A) hydrogen · The council's preliminary key

Q27 AP EAPCET 2025 · 24 May · Shift 1 MCQ

In a water tank, an air bubble rises from the bottom to the top surface of the water. If the depth of the water in the tank is 7.28 m and atmospheric pressure is 10 m of water, then the ratio of the radii of the bubble at the bottom of the tank and at the top surface of the water is
(Temperature of the water in the tank is constant)

(A) 2 : 3
(B) 5 : 6
(C) 3 : 4
(D) 4 : 5

Answer: (B) 5 : 6 · The council's preliminary key

Q28 AP EAPCET 2025 · 24 May · Shift 1 MCQ

In a container of volume $16.62\ \mathrm{m}^3$ at $0\ ^\circ\mathrm{C}$ temperature, 2 moles of oxygen, 5 moles of nitrogen and 3 moles of hydrogen are present, then the pressure in the container is
(Universal gas constant = $8.31\ \mathrm{J\ mol^{-1}\ K^{-1}}$)

(A) 1570 Pa
(B) 1270 Pa
(C) 1365 Pa
(D) 2270 Pa

Answer: (C) 1365 Pa · The council's preliminary key

Q29 AP EAPCET 2025 · 23 May · Shift 1 MCQ

The internal energy of one mole of a rigid diatomic gas at absolute temperature T is

(A) $3RT$
(B) $\frac{5}{2}RT$
(C) $\frac{3}{2}RT$
(D) $\frac{1}{2}RT$

Answer: (B) $\frac{5}{2}RT$ · The council's preliminary key

Q30 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If the internal energy of 3 moles of a gas at a temperature of $27\ ^\circ\mathrm{C}$ is $2250R$, then the number of degrees of freedom of the gas is
(R - Universal gas constant)

(A) 3
(B) 5
(C) 4
(D) 6

Answer: (B) 5 · The council's preliminary key

Q31 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If the ratio of specific heats of a gas at constant pressure and at constant volume is γ, then the number of degrees of freedom of the rigid molecules of the gas is

(A) $\frac{3\gamma-1}{2\gamma-1}$
(B) $\frac{2}{\gamma-1}$
(C) $\frac{9}{2}(\gamma-1)$
(D) $\frac{25}{2}(\gamma-1)$

Answer: (B) $\frac{2}{\gamma-1}$ · The council's preliminary key

Q32 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If the degrees of freedom of a gas molecule is 6, then the total internal energy of the gas molecule at a temperature of 47 °C (in eV) is

(Boltzmann constant = 1.38×10^{-23} J K^{-1})

(A) 414×10^{-4}
(B) 828×10^{-4}
(C) 927×10^{-4}
(D) 572×10^{-4}

Answer: (B) 828×10^{-4} · The council's preliminary key

Q33 AP EAPCET 2025 · 21 May · Shift 1 MCQ

If 2 moles of an ideal monoatomic gas at a temperature of $27\ ^\circ\mathrm{C}$ is mixed with 4 moles of another ideal monoatomic gas at a temperature of $327\ ^\circ\mathrm{C}$, then the temperature of mixture of the two gases is

(A) $300\ ^\circ\mathrm{C}$
(B) $227\ ^\circ\mathrm{C}$
(C) $233\ ^\circ\mathrm{C}$
(D) $327\ ^\circ\mathrm{C}$

Answer: (B) $227\ ^\circ\mathrm{C}$ · The council's preliminary key

Q34 AP EAPCET 2025 · 21 May · Shift 2 MCQ

A gaseous mixture consists of 2 moles of oxygen and 4 moles of argon at an absolute temperature T. Neglecting all vibrational modes, the total internal energy of the mixture of the gases is

(A) $4RT$
(B) $15RT$
(C) $9RT$
(D) $11RT$

Answer: (D) $11RT$ · The council's preliminary key

Q35 AP EAPCET 2025 · 21 May · Shift 2 MCQ

The average translational kinetic energy of the oxygen molecules at a temperature of $127\ ^\circ\mathrm{C}$ is (Boltzmann constant $= 1.38 \times 10^{-23}\ \mathrm{J\,K^{-1}}$)

(A) $4.07 \times 10^{-21}\ \mathrm{J}$
(B) $2.07 \times 10^{-21}\ \mathrm{J}$
(C) $8.28 \times 10^{-21}\ \mathrm{J}$
(D) $8.00 \times 10^{-21}\ \mathrm{J}$

Answer: (C) $8.28 \times 10^{-21}\ \mathrm{J}$ · The council's preliminary key

Q36 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If the temperature of a gas is increased from $127\ ^\circ\mathrm{C}$ to $527\ ^\circ\mathrm{C}$, then the rms speed of the gas molecules

(A) increases by 4 times
(B) becomes $\sqrt{2}$ times
(C) becomes half
(D) decreases by $\sqrt{2}$ times

Answer: (B) becomes $\sqrt{2}$ times · The council's preliminary key

Q37 TS EAPCET 2025 · 4 May · Shift 2 MCQ

The ratio of the average translational kinetic energies of hydrogen and oxygen at the same temperature is

(A) $1:8$
(B) $1:4$
(C) $1:1$
(D) $1:6$

Answer: (C) $1:1$ · The council's preliminary key

Q38 TS EAPCET 2025 · 3 May · Shift 1 MCQ

An air bubble rises from the bottom to the top of a water tank in which the temperature of the water is uniform. The surface area of the bubble at the top of the tank is 125% more than its surface area at the bottom of the tank. If the atmospheric pressure is equal to the pressure of 10 m water column, then the depth of water in the tank is

(A) 16.25 m
(B) 27 m
(C) 19 m
(D) 23.75 m

Answer: (D) 23.75 m · The council's preliminary key

Q39 TS EAPCET 2025 · 3 May · Shift 1 MCQ

The pressure of a mixture of 64 g of oxygen, 28 g of nitrogen and 132 g of carbon dioxide gases in a closed vessel is P. Under isothermal conditions if entire oxygen is removed from the vessel, the pressure of the mixture of remaining two gases is

(A) P
(B) $\frac{3P}{2}$
(C) $\frac{P}{3}$
(D) $\frac{2P}{3}$

Answer: (D) $\frac{2P}{3}$ · The council's preliminary key

Q40 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If the rms speed of the molecules of a gas at a temperature of $77\ ^\circ\mathrm{C}$ is $50\ \mathrm{ms}^{-1}$, then the rms speed of the same gas molecules at a temperature of $150.5\ ^\circ\mathrm{C}$ is

(A) $65\ \mathrm{ms}^{-1}$
(B) $35\ \mathrm{ms}^{-1}$
(C) $55\ \mathrm{ms}^{-1}$
(D) $45\ \mathrm{ms}^{-1}$

Answer: (C) $55\ \mathrm{ms}^{-1}$ · The council's preliminary key

Q41 TS EAPCET 2025 · 2 May · Shift 1 MCQ

The molar specific heat of a monoatomic gas at constant pressure is

(Universal gas constant $= 8.3\,\mathrm{J\,mol^{-1}\,K^{-1}}$)

(A) $24.9\,\mathrm{J\,mol^{-1}\,K^{-1}}$
(B) $20.75\,\mathrm{J\,mol^{-1}\,K^{-1}}$
(C) $41.5\,\mathrm{J\,mol^{-1}\,K^{-1}}$
(D) $16.6\,\mathrm{J\,mol^{-1}\,K^{-1}}$

Answer: (B) $20.75\,\mathrm{J\,mol^{-1}\,K^{-1}}$ · The council's preliminary key

Q42 TS EAPCET 2025 · 2 May · Shift 2 MCQ

When the temperature of a gas in a closed vessel is increased by 2.4 °C, its pressure increases by 0.5%. The initial temperature of the gas is

(A) 120 °C
(B) 240 °C
(C) 480 °C
(D) 207 °C

Answer: (D) 207 °C · The council's preliminary key

Q43 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If the heat required to increase the rms speed of 4 moles of a diatomic gas from v to $\sqrt{3}$v is 83.1 kJ, then the initial temperature of the gas is

(Universal gas constant $= 8.31\,\mathrm{J\,mol^{-1}\,K^{-1}}$)

(A) $377\,^{\circ}\mathrm{C}$
(B) $327\,^{\circ}\mathrm{C}$
(C) $227\,^{\circ}\mathrm{C}$
(D) $277\,^{\circ}\mathrm{C}$

Answer: (C) $227\,^{\circ}\mathrm{C}$ · The council's preliminary key

Q44 AP EAPCET 2024 · 23 May · Shift 1 MCQ

The ratio of the molar specific heat capacities of monatomic and diatomic gases at constant pressure is

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(A) $1:7$
(B) $5:7$
(C) $3:7$
(D) $2:7$

Answer: (B) $5:7$ · The council's preliminary key

Q45 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The ratio of kinetic energy of a diatomic gas molecule at a high temperature to that of NTP is

(A) $3/2$
(B) $5/3$
(C) $5/7$
(D) $7/5$

Answer: (D) $7/5$ · The council's preliminary key

Q46 AP EAPCET 2024 · 22 May · Shift 2 MCQ

The total internal energy of 2 moles of a monatomic gas at a temperature $27\,^{\circ}\mathrm{C}$ is U. The total internal energy of 3 moles of a diatomic gas at a temperature $127\,^{\circ}\mathrm{C}$ is

(A) U
(B) $\frac{10U}{3}$
(C) $2U$
(D) $\frac{2U}{3}$

Answer: (B) $\frac{10U}{3}$ · The council's preliminary key

Q47 AP EAPCET 2024 · 21 May · Shift 1 MCQ

A monoatomic gas of n-moles is heated from temperature T_1 to T_2 under two different conditions. (i) at constant volume and (ii) at constant pressure. The change in internal energy of the gas is

(A) More when heated at constant volume
(B) More when heated at constant pressure
(C) Same in both the cases
(D) Zero in both the cases

Answer: (C) Same in both the cases · The council's preliminary key

Q48 AP EAPCET 2024 · 21 May · Shift 1 MCQ

A poly atomic gas with n degrees of freedom has a mean kinetic energy per molecule given by (if N is Avogadro's number)

(A) $\frac{nKT}{N}$
(B) $\frac{nKT}{2N}$
(C) $\frac{nKT}{2}$
(D) $\frac{3KT}{2}$

Answer: (C) $\frac{nKT}{2}$ · The council's preliminary key

Q49 AP EAPCET 2024 · 21 May · Shift 2 MCQ

Match the following (f is number of degrees of freedom)

Gases		$\frac{C_P}{C_V}$ value
A Monoatomic	I	$\frac{4+f}{3+f}$
B Diatomic (rigid)	II	5/3
C Diatomic (non-rigid)	III	7/5
D Polyatomic	IV	9/7

(A) A-III, B-IV, C-I, D-II
(B) A-II, B-I, C-III, D-IV
(C) A-IV, B-III, C-I, D-II
(D) A-II, B-III, C-IV, D-I

Answer: (D) A-II, B-III, C-IV, D-I · The council's preliminary key

Q50 AP EAPCET 2024 · 20 May · Shift 1 MCQ

When the temperature of a gas is raised from $27\ ^\circ\mathrm{C}$ to $90\ ^\circ\mathrm{C}$, the increase in the rms velocity of the gas molecules is

(A) $10\ \%$
(B) $15\ \%$
(C) $20\ \%$
(D) $17.5\ \%$

Answer: (A) $10\ \%$ · The council's preliminary key

Q51 AP EAPCET 2024 · 20 May · Shift 2 MCQ

An ideal gas is kept in a cylinder of volume $3\ \mathrm{m}^3$ at a pressure of $3 \times 10^5\ \mathrm{Pa}$. The energy of the gas is

(A) $13.5 \times 10^6\ \mathrm{J}$
(B) $1.35 \times 10^5\ \mathrm{J}$
(C) $13.5 \times 10^5\ \mathrm{J}$
(D) $135 \times 10^6\ \mathrm{J}$

Answer: (C) $13.5 \times 10^5\ \mathrm{J}$ · The council's preliminary key

Q52 AP EAPCET 2024 · 19 May · Shift 2 MCQ

One mole of a gas having $\gamma = \frac{7}{5}$ is mixed with one mole of a gas having $\gamma = \frac{4}{3}$. The value of γ for the mixture is (γ is the ratio of the specific heats of the gas)

(A) $\frac{5}{11}$
(B) $\frac{11}{15}$
(C) $\frac{15}{11}$
(D) $\frac{5}{13}$

Answer: (C) $\frac{15}{11}$ · The council's preliminary key

Q53 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The rms velocity of a gas molecule of mass 'm' at a given temperature is proportional to

(A) m^0
(B) m
(C) $\sqrt{m}$
(D) $1/\sqrt{m}$

Answer: (D) $1/\sqrt{m}$ · The council's preliminary key

Q54 AP EAPCET 2024 · 18 May · Shift 1 MCQ

The molar specific heat capacity of a diatomic gas at constant pressure is C. The molar specific heat capacity of a monoatomic gas at constant volume is

(A) $\frac{2C}{7}$
(B) $\frac{3C}{7}$
(C) $\frac{C}{7}$
(D) $\frac{4C}{7}$

Answer: (B) $\frac{3C}{7}$ · The council's preliminary key

Q55 TS EAPCET 2024 · 11 May · Shift 1 MCQ

At a pressure P and temperature $127\ ^\circ\text{C}$, a vessel contains 21 g of a gas. A small hole is made into the vessel so that the gas in it leaks out. At a pressure of $\frac{2P}{3}$ and a temperature of $t\ ^\circ\text{C}$, the mass of the gas leaked out is 5 g. Then $t =$

(A) $273\ ^\circ\text{C}$
(B) $77\ ^\circ\text{C}$
(C) $350\ ^\circ\text{C}$
(D) $87\ ^\circ\text{C}$

Answer: (B) $77\ ^\circ\text{C}$ · The council's preliminary key

Q56 TS EAPCET 2024 · 10 May · Shift 1 MCQ

A vessel contains hydrogen and nitrogen gases in the ratio $2:3$ by mass. If the temperature of the mixture of the gases is $30\,^{\circ}\mathrm{C}$, then the ratio of the average kinetic energies per molecule of hydrogen and nitrogen gases is
(Molecular mass of hydrogen $=2$ and molecular mass of nitrogen $=28$)

(A) $3:7$
(B) $2:3$
(C) $1:1$
(D) $1:14$

Answer: (C) $1:1$ · The council's preliminary key

Q57 TS EAPCET 2024 · 10 May · Shift 2 MCQ

The temperature at which the rms speed of oxygen molecules is 75% of rms speed of nitrogen molecules at a temperature of 287 °C is

(A) 87 °C
(B) 127 °C
(C) 227 °C
(D) 360 °C

Answer: (A) 87 °C · The council's preliminary key

Q58 TS EAPCET 2024 · 9 May · Shift 1 MCQ

The total internal energy of 4 moles of a diatomic gas at a temperature of $27\,^{\circ}\mathrm{C}$ is
(Universal gas constant $=8.31\ \mathrm{J\ mol^{-1}\ K^{-1}}$)

(A) 13.47 kJ
(B) 4.98 kJ
(C) 24.93 kJ
(D) 14.96 kJ

Answer: (C) 24.93 kJ · The council's preliminary key

Q59 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If the temperature of a gas is increased from $27\,^{\circ}\mathrm{C}$ to $159\,^{\circ}\mathrm{C}$, the increase in the rms speed of the gas molecules is

(A) 142%
(B) 71%
(C) 80%
(D) 20%

Answer: (D) 20% · The council's preliminary key

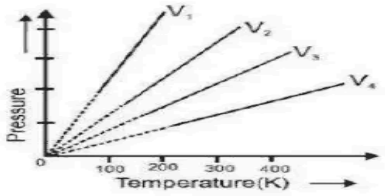
Q60 AP EAPCET 2023 · 19 May · Shift 1 MCQ

In the given pressure (P) – absolute temperature (T) graph of an ideal gas, the relation between volumes V_1, V_2, V_3, and V_4 is

(see the figure above)

In the given pressure (P) – absolute temperature (T) graph of an ideal gas, the relation between volumes V_1, V_2, V_3, and V_4 is

ఇచ్చిన ఆదర్శ వాయు పీడనం (P) – పరమ ఉష్ణోగ్రత (T) గ్రాఫ్ లో V_1, V_2, V_3, మరియు V_4 ఘన పరిమాణాల మధ్య సంబంధం



Options :

1. $V_1 = V_2 = V_3 = V_4$
2. $V_1 > V_2 > V_3 > V_4$
3. $V_1 > V_2 > V_3 < V_4$
4. $V_1 < V_2 < V_3 < V_4$

(A) $V_1 = V_2 = V_3 = V_4$
(B) $V_1 > V_2 > V_3 > V_4$
(C) $V_1 > V_2 > V_3 < V_4$
(D) $V_1 < V_2 < V_3 < V_4$

Answer: (D) $V_1 < V_2 < V_3 < V_4$ · The council's preliminary key

Q61 AP EAPCET 2023 · 18 May · Shift 1 MCQ

A mixture of gasses consists of 16 g of Helium and 16 g of Oxygen. The ratio of specific heats of the mixture is nearly

(A) 1.33
(B) 1.4
(C) 1.56
(D) 1.62

Answer: (D) 1.62 · The council's preliminary key

Q62 AP EAPCET 2023 · 18 May · Shift 1 MCQ

If the pressure of a gas increases by 2% at constant volume, then its temperature

(A) increases by 2%
(B) decreases by 2%
(C) does not change
(D) decreases by 1%

Answer: (A) increases by 2% · The council's preliminary key

Q63 AP EAPCET 2023 · 18 May · Shift 2 MCQ

The energy (in eV) possessed by a neon atom at $77\,^{\circ}\mathrm{C}$ is

(Boltzmann constant, $K_B = 1.38 \times 10^{-23}\ \mathrm{J\,K^{-1}}$)

(A) 1.32×10^{-3}
(B) 3.20×10^{-4}
(C) 4.52×10^{-2}
(D) 3.88×10^{-2}

Answer: (C) 4.52×10^{-2} · The council's preliminary key

Q64 AP EAPCET 2023 · 17 May · Shift 1 MCQ

If the rms speeds of helium and oxygen are equal, then the ratio of the temperatures of helium and oxygen is

(A) 1:8
(B) 2:1
(C) 1:4
(D) 4:1

Answer: (A) 1:8 · The council's preliminary key

Q65 AP EAPCET 2023 · 17 May · Shift 2 MCQ

A vessel that can withstand a pressure of 100 atm is filled with hydrogen at $27\,^{\circ}\mathrm{C}$ up to a pressure of 20 atm. If the vessel is heated, then the temperature at which it explodes is

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(A) $500\ \mathrm{K}$
(B) $1000\ \mathrm{K}$
(C) $1500\ \mathrm{K}$
(D) $2000\ \mathrm{K}$

Answer: (C) $1500\ \mathrm{K}$ · The council's preliminary key

Q66 AP EAPCET 2023 · 17 May · Shift 2 MCQ

If the average kinetic energy of a gas molecule at $27\,^{\circ}\mathrm{C}$ is 3.3×10^{-20} J, then the average kinetic energy of the gas molecules at $127\,^{\circ}\mathrm{C}$ is

(A) 15×10^{-20} J
(B) 0.68×10^{-20} J
(C) 4.4×10^{-20} J
(D) 10.3×10^{-21} J

Answer: (C) 4.4×10^{-20} J · The council's preliminary key

Q67 AP EAPCET 2023 · 16 May · Shift 1 MCQ

For the given concentration, if the ratio of the diameters of the molecules of two gases is $1:2$, then the ratio of their mean free paths is

(A) $4:1$
(B) $2:1$
(C) $1:1$
(D) $1:2$

Answer: (A) $4:1$ · The council's preliminary key

Q68 AP EAPCET 2023 · 16 May · Shift 2 MCQ

The relation between the pressure (P), volume (V) and average kinetic energy (E) of a gas is

(A) $P = \frac{E}{2V}$
(B) $P = \frac{3E}{2V}$
(C) $P = \frac{E}{3V}$
(D) $P = \frac{2E}{3V}$

Answer: (D) $P = \frac{2E}{3V}$ · The council's preliminary key

Q69 AP EAPCET 2023 · 15 May · Shift 1 MCQ

A vessel of volume 10 liters is filled with $\mathrm{H_2}$ gas. The total average translational kinetic energy of its molecules is 4.5×10^5 J. The pressure of hydrogen in the vessel is

(A) $3 \times 10^6\ \mathrm{Nm}^{-2}$
(B) $30 \times 10^6\ \mathrm{Nm}^{-2}$
(C) $30 \times 10^4\ \mathrm{Nm}^{-2}$
(D) $3 \times 10^4\ \mathrm{Nm}^{-2}$

Answer: (B) $30 \times 10^6\ \mathrm{Nm}^{-2}$ · The council's preliminary key

Q70 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The specific heat capacity of a monatomic gas at constant volume is x% of its specific heat capacity at constant pressure. Then x =

(A) 40
(B) 50
(C) 60
(D) 75

Answer: (C) 60 · The council's preliminary key

Q71 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The number of rotational degrees of freedom of a monatomic molecule is

(A) 2
(B) 1
(C) 0
(D) 3

Answer: (C) 0 · The council's preliminary key

Q72 TS EAMCET 2023 · 14 May · Shift 1 MCQ

N molecules each of mass m of gas A and 2N molecules each of mass 2m of gas B are contained in a vessel which is maintained at a temperature T. The mean square velocity of the molecules of gas B is denoted by V_2^2 and the mean square of the x-component velocity of the molecules of gas A is denoted by V_1^2, then $\frac{V_1}{V_2}$ is

(A) 2
(B) 1
(C) $\frac{2}{3}$
(D) $\sqrt{\frac{2}{3}}$

Answer: (D) $\sqrt{\frac{2}{3}}$ · The council's preliminary key

Q73 TS EAMCET 2023 · 14 May · Shift 2 MCQ

If the temperature of a gas is increased from $27^{\circ}\mathrm{C}$ to $159^{\circ}\mathrm{C}$, then the percentage increase in the rms speed of the gas molecules is

(A) 5
(B) 10
(C) 15
(D) 20

Answer: (D) 20 · The council's preliminary key

Q74 TS EAMCET 2023 · 13 May · Shift 1 MCQ

Air is filled at 60 °C in a vessel of open mouth. The vessel is heated to a temperature t °C so that $\frac{1}{4}^{\text{th}}$ of the air is escaped from the vessel. Assuming air as ideal gas and the volume of the vessel remaining constant, then the value of 't' is

(A) 80 °C
(B) 171 °C
(C) 333 °C
(D) 444 °C

Answer: (B) 171 °C · The council's preliminary key

Q75 TS EAMCET 2023 · 13 May · Shift 2 MCQ

The average energy possessed by an oscillator at a temperature 300 K is
(Boltzmann constant = $1.38 \times 10^{-23}\ \mathrm{JK}^{-1}$)

(A) $2.14 \times 10^{-2}\ \mathrm{J}$
(B) $2.07 \times 10^{-19}\ \mathrm{J}$
(C) $4.14 \times 10^{-21}\ \mathrm{J}$
(D) $4.6 \times 10^{-21}\ \mathrm{J}$

Answer: (C) $4.14 \times 10^{-21}\ \mathrm{J}$ · The council's preliminary key

Q76 TS EAMCET 2023 · 12 May · Shift 1 MCQ

Ratio of translational degrees of freedom to rotational degrees of freedom of a polyatomic linear gas molecule is

(A) 1:1
(B) 1:2
(C) 2:3
(D) 3:2

Answer: (D) 3:2 · The council's preliminary key

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Q77 TS EAMCET 2023 · 12 May · Shift 2 MCQ

For a given mass of a gas at constant temperature, the volume and the pressure are V and P respectively. Then the slope of the graph drawn between $\log_e V$ on X-axis and $\log_e P$ on Y-axis is

(A) 1
(B) -1
(C) Zero
(D) Infinity

Answer: (B) -1 · The council's preliminary key

Q78 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

At what temperature, an oxygen molecule has the same r.m.s velocity as the hydrogen molecule has at 20 K?

(A) 160 K
(B) 320 K
(C) 293 K
(D) 347 K

Answer: (B) 320 K · The council's preliminary key

Q79 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

At what temperature is the root mean square (rms) speed of Neon gas atoms is equal to the rms speed of Helium gas atom at $-33\,^{\circ}$C?
(atomic mass of Ne = 20.2 u, and that of He = 4.0 u)

(A) 1208 K
(B) 1210 K
(C) 1212 K
(D) 1220 K

Answer: (C) 1212 K · The council's preliminary key

Q80 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

If the root mean square (rms) speed of nitrogen molecules at room temperature is 100 m/s, then the rms speed of Helium molecule at the same temperature is

(A) $100\sqrt{7}\ \mathrm{m/s}$
(B) $350\ \mathrm{m/s}$
(C) $50\sqrt{14}\ \mathrm{m/s}$
(D) $100\ \mathrm{m/s}$

Answer: (A) $100\sqrt{7}\ \mathrm{m/s}$ · The council's preliminary key

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Q81 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

Statement (I) : Gas thermometers are less sensitive than liquid thermometers.
Statement (II) : The ratio of universal gas constant and avagadro's number is called Boltzman's constant.
Statement (III) : The density of a given mass of a gas at constant pressure is inversely proportional to its absolute temperature.
The correct option among the following is

(A) Statements I, II, III are true.
(B) Statements I, II are true, but statement III is false.
(C) Statements II, III are true, but statement I is false.
(D) Statements I, II, III are false.

Answer: (C) Statements II, III are true, but statement I is false. · The council's preliminary key

Q82 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

Two boxes are at the same temperature. The first box contains gas with molecular mass m_1 and rms speed v_1. The second box contains gas with molecular mass m_2 and average speed v_2. If $v_1 = 1.5\, v_2$, then $\frac{m_1}{m_2}$ is

(A) 1.25
(B) 0.74
(C) 0.52
(D) 0.26

Answer: (C) 0.52 · The council's preliminary key

Q83 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

The temperature at which the r.m.s velocity of a gas triples to its r.m.s. velocity at $0\ ^\circ\mathrm{C}$ is

(A) $2184\ \mathrm{K}$
(B) $2184\ ^\circ\mathrm{C}$
(C) $2100\ ^\circ\mathrm{C}$
(D) $2100\ \mathrm{K}$

Answer: (B) $2184\ ^\circ\mathrm{C}$ · The council's preliminary key

Q84 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

A gaseous mixture consists of 4 g oxygen and 4 g of helium. The ratio $\frac{C_P}{C_V}$ of mixture is (C_P and C_V are molar specific heats of the mixture at constant pressure and at constant volume respectively).

(A) $\frac{29}{13}$
(B) $\frac{47}{18}$
(C) $\frac{47}{29}$
(D) $\frac{18}{13}$

Answer: (C) $\frac{47}{29}$ · The council's preliminary key

Q85 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

The volume of a gas at $30\ ^\circ$C temperature and 760 mm of Hg pressure is 100 cc. Then its volume at the same temperature and 400 mm of Hg is

(A) 190 cc
(B) 210 cc
(C) 150 cc
(D) 120 cc

Answer: (A) 190 cc · The council's preliminary key

Q86 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

A vessel contains 3 moles of He, 1 mole of Ar, 5 moles of N_2 and 3 moles of H_2. If the vibrational modes are ignored, the total internal energy of the system of gases is

(A) 20 RT
(B) 26 RT
(C) 25 RT
(D) 30 RT

Answer: (B) 26 RT · The council's preliminary key

Q87 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

A container of 10 L is filled with an ideal gas at a temperature of $27\ ^\circ$C at a pressure 12 atm. The volume of the container is reduced to 6 L and the temperature of the gas in increased by $30\ ^\circ$C, then the final pressure of the gas is

(A) 22 atm
(B) 20 atm
(C) 11 atm
(D) 9 atm

Answer: (A) 22 atm · The council's preliminary key

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Q88 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

Assertion (A) : When an ideal gas is compressed adiabatically its temperature and the average kinetic energy of the gas molecules increase.
Reason (R) : The kinetic energy increases because of collisions of molecules with moving parts of wall only.

(A) (A) and (R) are true and (R) is correct explanation of (A)
(B) (A) and (R) are true but (R) is not correct explanation of (A)
(C) (A) is true and (R) is false
(D) (A) is false and (R) is true

Answer: (A) (A) and (R) are true and (R) is correct explanation of (A) · The council's preliminary key

Q89 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

The number of rotational degrees of freedom of a diatomic molecule

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (C) 2 · The council's preliminary key

Q90 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

The rms speed of oxygen and room temperature is about $500\ \mathrm{ms}^{-1}$. The rms speed of hydrogen at the same temperature is about

(A) $125\ \mathrm{m\,s}^{-1}$
(B) $2000\ \mathrm{m\,s}^{-1}$
(C) $8000\ \mathrm{m\,s}^{-1}$
(D) $500\ \mathrm{m\,s}^{-1}$

Answer: (B) $2000\ \mathrm{m\,s}^{-1}$ · The council's preliminary key

Q91 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

The number of vibrational degrees of freedom of a diatomic molecule is

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (B) 1 · The council's preliminary key

Q92 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

In non-rigid diatomic molecule with an additional vibrational mode

(A) $81C_v^2 = 49C_P^2$
(B) $49C_v^2 = 25C_P^2$
(C) $49C_v^2 = 81C_P^2$
(D) $25C_v^2 = 49C_P^2$

Answer: (A) $81C_v^2 = 49C_P^2$ · The council's preliminary key

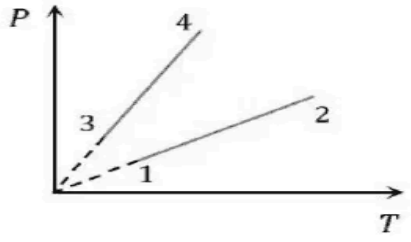
Q93 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

Pressure versus temperature graph of equal number of moles of an ideal gas of different volumes are plotted as shown in the figure. Choose the correct alternative
(see the figure above)

Mandatory : No

Pressure versus temperature graph of equal number of moles of an ideal gas of different volumes are plotted as shown in the figure. Choose the correct alternative

పేరు పేరు ఘనపరిమాణాలు మరియు సమాన సంఖ్యలో మోల్‌లు గల ఆదర్శ వాయువు యొక్క పీడనము మరియు ఉష్ణోగ్రతకు పటములో చూపినట్లు గ్రాఫ్ గీయబడినది. ఈ క్రింది వానిలో సరియైనది



Options :

1. $V_1 = V_2 = V_3 = V_4$
2. $V_4 > V_3 > V_2 > V_1$
3. $V_1 = V_2 \; ; \; V_3 = V_4 \;\; \& \;\; V_2 > V_3$
4. $V_1 = V_2 \; ; \; V_3 = V_4 \;\; \& \;\; V_2 < V_3$

(A) $V_1 = V_2 = V_3 = V_4$
(B) $V_4 > V_3 > V_2 > V_1$
(C) $V_1 = V_2;\ V_3 = V_4 \ \& \ V_2 > V_3$
(D) $V_1 = V_2;\ V_3 = V_4 \ \& \ V_2 < V_3$

Answer: (C) $V_1 = V_2;\ V_3 = V_4 \ \& \ V_2 > V_3$ · The council's preliminary key

Q94 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

A vessel has $6\,\mathrm{g}$ of oxygen at pressure 'P' and temperature $400\,\mathrm{K}$. A small hole is made in it so that oxygen leaks out. How much oxygen has leaked out if the final pressure is $\frac{P}{2}$ and final temperature is $300\,\mathrm{K}$?

(A) $5\,\mathrm{g}$
(B) $4\,\mathrm{g}$
(C) $2\,\mathrm{g}$
(D) $3\,\mathrm{g}$

Answer: (C) $2\,\mathrm{g}$ · The council's preliminary key

Q95 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

If α and β be the volume and pressure coefficients respectively of an ideal gas, then

(A) $\alpha = \beta$
(B) $\alpha > \beta$
(C) $2\alpha = \beta$
(D) $\alpha < \beta$

Answer: (A) $\alpha = \beta$ · The council's preliminary key

Q96 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

What is the number of degrees of freedom for an oscillating simple pendulum?

(A) One
(B) Two
(C) Three
(D) More than three

Answer: (A) One · Checked by our team

Q97 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

The respective speeds of the five molecules are $1, 2, 3, 4$ and $5\ \mathrm{km.s^{-1}}$. Then the ratio of their RMS velocity and the average velocity will be _____

(A) $\sqrt{11} : 3$
(B) $3 : \sqrt{11}$
(C) $1 : 2$
(D) $3 : 4$

Answer: (A) $\sqrt{11} : 3$ · The council's preliminary key

Q98 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

One mole of a gas at a pressure 2 Pa and temperature 27 °C is heated till both pressure and volume are doubled. What is the temperature of the gas?

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(A) 300 K
(B) 600 K
(C) 900 K
(D) 1200 K

Answer: (D) 1200 K · The council's preliminary key

Q99 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

The pressure of a gas is proportional to

(A) The sum of kinetic and potential energies
(B) Potential energy
(C) Kinetic energy
(D) None of the above

Answer: (C) Kinetic energy · The council's preliminary key

Q100 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

When the temperature of an ideal gas is increased from $27\ ^{\circ}\mathrm{C}$ to $127\ ^{\circ}\mathrm{C}$, calculate the percentage increase in its v_{rms}.

(A) $37\ \%$
(B) $11\ \%$
(C) $33\ \%$
(D) $15.5\ \%$

Answer: (D) $15.5\ \%$ · The council's preliminary key

Q101 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

A balloon contains $1500\ m^3$ of He at $27\ ^{\circ}\mathrm{C}$ and 4 atmospheric pressure. the volume of He at $-3\ ^{\circ}\mathrm{C}$ temperature and 2 atmospheric pressure will be _____

(A) $1500\ m^3$
(B) $1700\ m^3$
(C) $1900\ m^3$
(D) $2700\ m^3$

Answer: (D) $2700\ m^3$ · The council's preliminary key

Q102 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

Which one of the graphs below best illustrates the relationship between internal energy U of an ideal gas and temperature T of the gas in K?

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Mandatory : No

Which one of the graphs below best illustrates the relationship between internal energy U of an ideal gas and temperature T of the gas in K?

ఒక ఆదర్శవాయువు యొక్క అంతరిక శక్తి మరియు వాయువు యొక్క ఉష్ణోగ్రతల మధ్య సంబంధమును సూచించే గ్రాఫ్ _____

Options :

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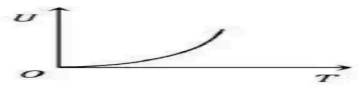
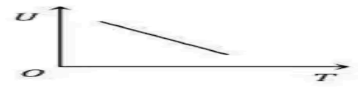
1. 

2. 

3. 

4. 

(A) *see figure*

(B) *see figure*

(C) *see figure*

(D) *see figure*

Answer: (A) · The council's preliminary key

Q103 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

A vessel has 6 g of oxygen at pressure P and temperature 400 K. A small hole is made in it so that oxygen leaks out. How much oxygen leaks out if the final pressure is $\frac{P}{2}$ and temperature is 300 K?

(A) 5 g

(B) 4 g

(C) 2 g

(D) 3 g

Answer: (C) 2 g · The council's preliminary key

Q104 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

A molecule is travelling in air at 300 K and 1 atm, and the radius of the molecule is 0.6×10^{-10} m. Calculate the approx. mean free path of the molecule. (the number density is 2.44×10^{25} molecules / m^3)

(A) $\frac{0.2}{\pi} \times 10^{-5}$ m
(B) $\frac{0.3}{\pi} \times 10^{-5}$ m
(C) $\frac{0.4}{\pi} \times 10^{-5}$ m
(D) $\frac{0.1}{\pi} \times 10^{-5}$ m

Answer: (A) $\frac{0.2}{\pi} \times 10^{-5}$ m · The council's preliminary key

Q105 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

A cylinder consists of a gas mixture of Helium and Oxygen. If the mass of Helium is $4\ \mathrm{gm}$ and the mass of oxygen is $32\ \mathrm{gm}$, then the ratio of specific heat of the mixture (C_p/C_v)

(A) $2/3$
(B) $3/2$
(C) $1/2$
(D) $1/3$

Answer: (B) $3/2$ · The council's preliminary key

Q106 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

The temperature at which the r.m.s speed of molecules in hydrogen gas will be double of its initial value at $27^\circ\mathrm{C}$ is

(A) $300^\circ\mathrm{C}$
(B) $1473^\circ\mathrm{C}$
(C) $927^\circ\mathrm{C}$
(D) $546^\circ\mathrm{C}$

Answer: (C) $927^\circ\mathrm{C}$ · The council's preliminary key

Q107 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

Consider an ideal gas in a closed container at 300 K. The container is then heated so that the average velocity of a particles of the gas increases by a factor of 4. What would be the final temperature?

(A) $4500\ ^\circ\mathrm{C}$
(B) $4527\ ^\circ\mathrm{C}$
(C) $4617\ ^\circ\mathrm{C}$
(D) $4600\ ^\circ\mathrm{C}$

Answer: (B) $4527\ ^\circ\mathrm{C}$ · The council's preliminary key

Q108 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The mean free path for a gas at temperature 300 K and pressure 600 torr is 10^{-7} m. The mean free path of the gas at a temperature 400 K and pressure 200 torr will be

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(A) 2.5×10^{-8} m
(B) 4.4×10^{-8} m
(C) 3.3×10^{-8} m
(D) 4×10^{-7} m

Answer: (D) 4×10^{-7} m · The council's preliminary key

Q109 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

Two non-reactive monoatomic ideal gases have their atomic masses in the ratio 3 : 4. The ratio of their partial pressures when enclosed in a vessel kept at a constant temperature is 2 : 3. The ratio of their densities is

(A) 1.1
(B) 2.0
(C) 0.9
(D) 0.5

Answer: (D) 0.5 · The council's preliminary key

Q110 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

As per kinetic theory of gases which of the following statements is / are true?
a) Temperature of a gas is a measure of average kinetic energy of a molecule
b) Temperature of a gas depends on the nature of the gas
c) Heavier molecule has lower average speed
d) Lighter molecule has lower average speed

(A) a & b are true
(B) b & c are true
(C) a & c are true
(D) b & d are true

Answer: (C) a & c are true · The council's preliminary key

Q111 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

If the rms velocity of a perfect gas at 27 °C is 500 $m.s^{-1}$, the same at 927 °C will be _____

(A) 5000 $m.s^{-1}$
(B) 2000 $m.s^{-1}$
(C) 1000 $m.s^{-1}$
(D) 3000 $m.s^{-1}$

Answer: (C) 1000 $m.s^{-1}$ · The council's preliminary key

Q112 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

Pressure of a gas of constant volume at $20\,^{\circ}\mathrm{C}$ is $90\ \mathrm{cm}$ of Hg. At what temperature the pressure would change to $75\ \mathrm{cm}$ of Hg.

(A) $233.2\,^{\circ}\mathrm{C}$
(B) $-28.8\,^{\circ}\mathrm{C}$
(C) $-24.2\,^{\circ}\mathrm{C}$
(D) $28.8\,^{\circ}\mathrm{C}$

Answer: (B) $-28.8\,^{\circ}\mathrm{C}$ · The council's preliminary key

Q113 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A light container having a diatomic gas enclosed with in is moving with velocity 'V'. Mass of the gas is 'M' and number of moles is 'n'. The kinetic energy of gas w.r.t ground is

(A) $\frac{1}{2}MV^2 + \frac{3}{2}nRT$
(B) $\frac{1}{2}MV^2$
(C) $\frac{1}{2}MV^2 + \frac{5}{2}nRT$
(D) $\frac{5}{2}nRT$

Answer: (C) $\frac{1}{2}MV^2 + \frac{5}{2}nRT$ · The council's preliminary key

Q114 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

The ratio of the adiabatic to isothermal elasticities of a triatomic (non - linear) gas is _____

(A) $3:4$
(B) $1:2$
(C) $4:3$
(D) $5:3$

Answer: (C) $4:3$ · The council's preliminary key

Q115 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

A vessel contains mixture of hydrogen and oxygen gasses in the ratio of their masses equal to $1:5$. The ratio of mean kinetic energies of the two gasses is:

(A) $1:1$
(B) $1:16$
(C) $16:5$
(D) $5:16$

Options (1) or (3) were accepted. More than one answer was accepted. · The council's preliminary key

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Q116 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

The average kinetic energy of H_2 molecules at $300\,K$ is E. At the same temperature the average kinetic energy of O_2 molecule is

(A) E
(B) $\frac{E}{4}$
(C) $\frac{E}{16}$
(D) $16E$

Answer: (A) E · The council's preliminary key

Q117 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

A gas volume $251\ cm^3$ at $20\ ^\circ C$ and pressure 78 cm of Hg. Find its volume at N.T.P.

(A) $420\ cm^3$
(B) $440\ cm^3$
(C) $240\ cm^3$
(D) $100\ cm^3$

Answer: (C) $240\ cm^3$ · The council's preliminary key

Q118 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

Two vessels A and B contain oxygen. The volume of B is twice that of A, the pressure of B is thrice that of A and the temperature of B is half of that of A. Then find the ratio of number of molecules of oxygen in vessels A and B.

(A) $1:3$
(B) $1:12$
(C) $3:4$
(D) $1:6$

Answer: (B) $1:12$ · The council's preliminary key

Q119 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

The ratio of specific heats at constant pressure and at constant volume is 'γ'. To find out the degree of freedom, the expression is _____

(A) $f = \frac{2}{\gamma - 1}$

(B) $f = \frac{\gamma + 1}{2}$

(C) $f = \frac{2}{\gamma + 1}$

(D) $f = \frac{1}{\gamma + 1}$

Answer: (A) $f = \frac{2}{\gamma - 1}$ · The council's preliminary key

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Q120 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

Mean free path of molecules in a polyatomic gas is independent of

(A) number density of the molecules

(B) volume of the molecule

(C) Temperature of the gas

(D) Gas constant R

Answer: (D) Gas constant R · Official TGCHE final key

Q121 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

All gases deviate from gas laws at

(A) Low pressure and high temperature

(B) High pressure and low temperature

(C) Low pressure and low temperature

(D) High pressure and high temperature

Answer: (B) High pressure and low temperature · Official TGCHE final key

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Q122 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

An ideal gas at temperature T, pressure P occupies a volume V. If its temperature is halved and pressure doubled, what is its new volume?

(A) $\frac{V}{4}$

(B) $\frac{V}{2}$

(C) V

(D) 2V

Answer: (A) $\frac{V}{4}$ · Official TGCHE final key

Q123 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

If a gas has n degrees of freedom, then the ratio of $\frac{C_p}{C_v}$ is

(A) $\frac{n+2}{n}$
(B) $\frac{2n+1}{n}$
(C) $\frac{n+2}{2n}$
(D) $\frac{n+4}{2n}$

Answer: (A) $\frac{n+2}{n}$ · Official TGCHE final key

Q124 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

How many rotational degrees of freedom does a rigid diatomic molecule have?

(A) 0
(B) 1
(C) 2
(D) 3

Answer: (C) 2 · Official TGCHE final key

Q125 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

Two vessels separately contain two ideal gases A and B at the same temperature. The pressure of gas A is three times the pressure of gas B. Under these conditions, the density of gas A is found to be two times the density of B. The ratio of molecular weights of gas A and B, i.e. $\frac{M_A}{M_B}$ is

(A) $\frac{2}{3}$
(B) $\frac{3}{2}$
(C) $\frac{3}{4}$
(D) $\frac{4}{3}$

Answer: (A) $\frac{2}{3}$ · Official TGCHE final key

Q126 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

In an ideal gas if the masses of all molecules are doubled and their speeds are halved, then the ratio of initial and final pressures of the gas is

(A) 2:1
(B) 1:2
(C) 4:1
(D) 1:4

Answer: (A) 2:1 · Official TGCHE final key

Q127 TS EAMCET 2019 · 6 May · Shift 1 MCQ

Consider an ideal gas at pressure P, volume V and temperature T. The mean free path for molecules of the gas is L. If the radius of gas molecules, as well as pressure, volume and temperature of the gas are doubled, then the mean free path will be

(A) $\frac{5L}{2}$
(B) $\frac{L}{4}$
(C) $\frac{L}{8}$
(D) $2L$

Answer: (B) $\frac{L}{4}$ · Official TGCHE final key

Q128 TS EAMCET 2019 · 4 May · Shift 1 MCQ

An ideal gas in a closed container is heated so that the final rms speed of the gas particles increases by 2 times the initial rms speed. If the initial gas temperature is 27 °C, then the final temperature of the ideal gas is

(A) $1200\ ^\circ\mathrm{C}$
(B) $927\ ^\circ\mathrm{C}$
(C) $827\ ^\circ\mathrm{C}$
(D) $1473\ ^\circ\mathrm{C}$

Answer: (B) $927\ ^\circ\mathrm{C}$ · Official TGCHE final key

Q129 TS EAMCET 2019 · 4 May · Shift 2 MCQ

A vessel of volume V contains ideal gas having mass density ρ at temperature T and pressure P. After a portion of the gas is let out, the pressure in the vessel is decreased by ΔP. The mass of the released gas is

(A) $\rho V\,\Delta P/P$
(B) $\frac{\Delta P}{P}$
(C) $\frac{\rho}{P}$
(D) $(\rho V)^2\,\Delta P/P$

Answer: (A) $\rho V\,\Delta P/P$ · Official TGCHE final key

Q130 TS EAMCET 2019 · 4 May · Shift 2 MCQ

A thermally insulated vessel containing monoatomic gas is moving with a speed of 30 m/s. If the vessel suddenly stops, the increase in gas temperature is (Molar mass of gas $= 83$ g/mol and $R = 8.3$ J/K-mol)

(A) 1 K
(B) 3 K
(C) 4 K
(D) 6 K

Answer: (B) 3 K · Official TGCHE final key

Q131 TS EAMCET 2019 · 3 May · Shift 1 MCQ

Two gases A and B are contained in two separate, but otherwise identical containers. Gas A consists of monoatomic molecules, each with atomic mass of 4 u whereas, Gas B consists of rigid diatomic molecules, each with atomic mass of 20 u. If Gas A is kept at 27 °C, at what temperature should Gas B be kept so that both have the same r.m.s. speed?

(A) 27 °C
(B) 54 °C
(C) 270 °C
(D) 627 °C

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Q132 TS EAMCET 2019 · 3 May · Shift 2 MCQ

An ideal gas is placed in a tank at $27\ ^{\circ}\mathrm{C}$. The pressure is initially 600 kPa. One fourth of the gas is then released from the tank and thermal equilibrium is established. What will be the pressure if the temperature is $327\ ^{\circ}\mathrm{C}$?

(A) 900 kPa
(B) 1000 kPa
(C) 1050 kPa
(D) 1250 kPa

Answer: (A) 900 kPa · Official TGCHE final key

Q133 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

Three closed vessels A, B and C are at the same temperature 'T' and contain gases. Vessel A contains only O_2, B contains only N_2 and C contains a mixture of equal quantities of O_2 and N_2. If the rms speed of O_2 molecules in vessel 'A' is v_1 and that of N_2 molecules in vessel 'B' is v_2 then the rms speed of O_2 molecules in vessel 'C' is

(A) $\left(\frac{v_1+v_2}{2}\right)$
(B) v_1
(C) $(v_1v_2)^{\frac{1}{2}}$
(D) $\frac{v_1}{2}$

Answer: (B) v_1 · Official APSCHE final key

Q134 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Under standard conditions, the density of a gas is $\frac{1400}{1089}\ \mathrm{kg\,m^{-3}}$ and the speed of sound propagation in it is $330\ \mathrm{ms^{-1}}$, then the number of degrees of freedom of the gas molecules is

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(A) 2
(B) 7
(C) 5
(D) 3

Answer: (C) 5 · Official APSCHE final key

Q135 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

The y-components of velocities of the molecules of a gas are $-7, -6, -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6, +7\ \mathrm{ms}^{-1}$ then the rms velocity is

(A) $\sqrt{\frac{56}{3}}\ \mathrm{ms}^{-1}$
(B) $\sqrt{\frac{28}{3}}\ \mathrm{ms}^{-1}$
(C) $\sqrt{\frac{112}{3}}\ \mathrm{ms}^{-1}$
(D) $\sqrt{\frac{84}{3}}\ \mathrm{ms}^{-1}$

Answer: (A) $\sqrt{\frac{56}{3}}\ \mathrm{ms}^{-1}$ · Official APSCHE final key

Q136 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

At a temperature of 314 K and a pressure of 100 kPa, the speed of sound in a gas is $1380\ \mathrm{ms}^{-1}$. The radius of each gas molecule is 0.5 Å. The frequency of sound at which the wavelength of sound wave in the gas becomes equal to the mean free path of the gas molecules is (Boltzmann Constant = $1.38 \times 10^{-23}\ \mathrm{JK}^{-1}$)

(A) 1000 MHz
(B) $1000\sqrt{2}$ MHz
(C) $\frac{1000}{\sqrt{2}}$ MHz
(D) 500 MHz

Answer: (B) $1000\sqrt{2}$ MHz · Official APSCHE final key

Q137 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

The amount of heat that must be supplied to 35 g of oxygen at room temperature to raise its temperature by $80\ ^{\circ}\mathrm{C}$ at constant volume is
(molecular mass of oxygen is 32 and $\mathrm{R} = 8.3\ \mathrm{J\,mol}^{-1}\,\mathrm{K}^{-1}$)

(A) 2.84 kJ
(B) 1.68 kJ
(C) 1.81 kJ
(D) 2.88 kJ

Answer: (C) 1.81 kJ · Official APSCHE final key

Q138 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

For a gas the value of $\frac{R}{C_v} = 0.4$, so the gas is
(R - Universal gas constant)

(A) monoatomic
(B) diatomic
(C) triatomic
(D) polyatomic

Answer: (B) diatomic · Official APSCHE final key

Q139 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

The average translational kinetic energy of a molecule in a gas becomes equal to 0.69 eV at a temperature about
[Boltzmann constant $= 1.38 \times 10^{-23}\ \mathrm{J\,K^{-1}}$]

(A) $3370\ ^\circ\mathrm{C}$
(B) $3388\ ^\circ\mathrm{C}$
(C) $5333\ ^\circ\mathrm{C}$
(D) $5060\ ^\circ\mathrm{C}$

Answer: (D) $5060\ ^\circ\mathrm{C}$ · Official APSCHE final key

Q140 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

If the speed of sound in a mixture of 2 moles of Helium and 2 moles of Hydrogen at temperature $\frac{972}{5}\ \mathrm{K}$ is $\mathrm{n} \times 100\ \mathrm{ms^{-1}}$, then the value of n is (Take $\mathrm{R} = \frac{25}{3}\ \mathrm{Jmol^{-1}K^{-1}}$)

(A) 9
(B) 10
(C) 100
(D) 90

Answer: (A) 9 · Official APSCHE final key

Q141 TS EAMCET 2018 · 7 May · Shift 1 MCQ

A vessel of volume V contains a mixture of ideal gases at temperature T. The gas mixture contains n_1, n_2 and n_3 moles of three gases. Assuming ideal gas system, the pressure of the mixture is

(A) $\frac{(n_1+n_2+n_3)RT}{V}$
(B) $\frac{(n_1n_2n_3)RT}{V}$
(C) $\frac{RT}{V(n_1+n_2+n_3)}$
(D) $\frac{RT}{V(n_1n_2n_3)}$

Answer: (A) $\frac{(n_1+n_2+n_3)RT}{V}$ · The council's preliminary key

Q142 TS EAMCET 2018 · 7 May · Shift 1 MCQ

A polyatomic gas has f vibrational degrees of freedom. The ratio of the specific heat at constant pressure to that at constant volume will be

(A) $\frac{4+f}{3+f}$
(B) $\frac{4-f}{3-f}$
(C) $\frac{3+f}{4+f}$
(D) $\frac{3-f}{4-f}$

Answer: (A) $\frac{4+f}{3+f}$ · The council's preliminary key

Q143 TS EAMCET 2018 · 5 May · Shift 1 MCQ

A gas mixture contains n_1 moles of a monoatomic gas and n_2 moles of gas of rigid diatomic molecules. Each molecule in monoatomic and diatomic gas has 3 and 5 degrees of freedom respectively. If the adiabatic exponent $\left(\frac{C_p}{C_v}\right)$ for this gas mixture is 1.5, then the ratio $\frac{n_1}{n_2}$ will be

(A) 1
(B) 1.5
(C) 2
(D) 2.5

Answer: (A) 1 · The council's preliminary key

Q144 TS EAMCET 2018 · 5 May · Shift 2 MCQ

The root mean square (rms) velocity of an ideal gas at a temperature T is v. If the temperature is increased to $4T$, the rms velocity of the gas is

(A) $\sqrt{3}$ v
(B) $\sqrt{2}$ v
(C) 2 v
(D) 3 v

Answer: (C) 2 v · The council's preliminary key

Q145 TS EAMCET 2018 · 4 May · Shift 1 MCQ

The internal energy of the air, in a room of volume V, at temperature T and with outside pressure P increasing linearly with time, varies as

(A) increases linearly
(B) increases exponentially
(C) decreases linearly
(D) remains constant

Answer: (A) increases linearly · The council's preliminary key

Q146 TS EAMCET 2018 · 4 May · Shift 2 MCQ

In a cubic container of inner side length 10 cm, nitrogen gas of 100 kPa pressure is maintained at 300 K. If the pressure inside the gas is increased to 300 kPa by adding oxygen gas, the ratio of number of N_2 to O_2 molecules in the container is

(A) 0.5
(B) 3.0
(C) 1.5
(D) 0.33

Answer: (A) 0.5 · The council's preliminary key

Q147 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

The ratio of the speed of sound in a monatomic gas at $27\,^{\circ}C$ and rms speed of the molecules of the same gas at a temperature of $127\,^{\circ}C$ is _____

(A) $1:2$
(B) $\sqrt{5}:\sqrt{12}$
(C) $3:4$
(D) $\sqrt{13}:\sqrt{17}$

Answer: (B) $\sqrt{5}:\sqrt{12}$ · The council's preliminary key

Q148 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

A gaseous mixture has 2 moles of oxygen and 4 moles of Argon at a temperature T. Neglecting all vibrational modes of the molecules, the total internal energy of the system is _____
(R-Universal gas constant)

(A) $4RT$
(B) $15RT$
(C) $9RT$
(D) $11RT$

Answer: (D) $11RT$ · The council's preliminary key

Q149 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

Tyre of a bicycle has volume $2 \times 10^{-3}\ \mathrm{m}^3$. Initially the tube is filled 75% of its volume by air at atmospheric pressure $10^5\ \mathrm{Nm}^{-2}$. When a rider is on the bicycle, the area of contact of tyre with road is $24 \times 10^{-4}\ \mathrm{m}^2$. The mass of rider with bicycle is 120 kg. If a pump delivers a volume $500\ \mathrm{cm}^3$ of air in each stroke then the number of strokes required to inflate the tyre is ($g = 10\ \mathrm{ms}^{-2}$)

(A) 10
(B) 11
(C) 21
(D) 20

Answer: (C) 21 · The council's preliminary key

Q150 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

A diatomic gas consisting of rigid molecules is at a temperature of $87\ ^\circ\mathrm{C}$. If the moment of inertia of the rotating diatomic rigid molecule is $2.76 \times 10^{-39}\ \mathrm{gcm}^2$ then the rms angular speed of the molecule is (Boltzmann constant = $1.38 \times 10^{-23}\ \mathrm{JK}^{-1}$)

(A) $6 \times 10^{12}\ \mathrm{rads}^{-1}$
(B) $3 \times 10^{12}\ \mathrm{rads}^{-1}$
(C) $6 \times 10^{13}\ \mathrm{rads}^{-1}$
(D) $3 \times 10^{13}\ \mathrm{rads}^{-1}$

Answer: (A) $6 \times 10^{12}\ \mathrm{rads}^{-1}$ · The council's preliminary key

Q151 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

The rms speed of oxygen molecule at a certain temperature is $600\ \mathrm{ms}^{-1}$. If the temperature is doubled and oxygen molecule dissociates into atomic oxygen atoms, the new rms speed is

(A) $120\ \mathrm{ms}^{-1}$
(B) $150\ \mathrm{ms}^{-1}$
(C) $1200\ \mathrm{ms}^{-1}$
(D) $600\ \mathrm{ms}^{-1}$

Answer: (C) $1200\ \mathrm{ms}^{-1}$ · The council's preliminary key

Q152 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

For a molecule of an ideal gas, the number density is $2\sqrt{2} \times 10^8\ \text{cm}^{-3}$ and the mean free path is $\frac{10^{-2}}{\pi}$ cm. The diameter of the gas molecule is

(A) 5×10^{-4} cm
(B) 0.5×10^{-4} cm
(C) 2.5×10^{-4} cm
(D) 4×10^{-4} cm

Answer: (A) 5×10^{-4} cm · The council's preliminary key

Q153 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

The absolute temperature at which the rms speed of a hydrogen molecule is equal to its escape speed from the Moon's surface is (radius of Moon is R, g is acceleration due to gravity on Moon's surface, m is mass of hydrogen molecule and k is Boltzmann constant)

(A) $\frac{mgR}{2k}$
(B) $\frac{2mgR}{k}$
(C) $\frac{3mgR}{2k}$
(D) $\frac{2mgR}{3k}$

Answer: (D) $\frac{2mgR}{3k}$ · The council's preliminary key

Q154 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

If the average translational kinetic energy of a molecule in a gas is equal to the kinetic energy of an electron accelerating from rest through 10 volt, then the temperature of the gas molecule is (Boltzmann constant $= 1.38 \times 10^{-23}\ \text{JK}^{-1}$)

(A) 73.7 K
(B) 77.3×10^3 K
(C) 7.73×10^3 K
(D) 730 K

Answer: (B) 77.3×10^3 K · The council's preliminary key

Q155 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

If v_1 is the speed of sound in a diatomic gas at 273 °C and v_2 is the r.m.s. speed of its molecules at 273 K, then $\frac{v_1}{v_2} =$

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(A) $\sqrt{\frac{15}{14}}$
(B) $\sqrt{\frac{14}{15}}$
(C) $\sqrt{\frac{7}{8}}$
(D) $\sqrt{\frac{8}{7}}$

Answer: (B) $\sqrt{\frac{14}{15}}$ · The council's preliminary key

Q156 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

A mixture of two non-reactive ideal gases is enclosed in a vessel consisting of one mole of a monatomic gas 'A' and 'n' moles of diatomic gas 'B' at a temperature 'T'. If the adiabatic constant of the gaseous mixture is $\frac{13}{9}$, then the value of 'n' is

(A) 5
(B) 2
(C) 4
(D) 3

Answer: (D) 3 · The council's preliminary key

Q157 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

The rms speed of oxygen molecule at a certain absolute temperature is 'v'. If the absolute temperature is doubled and the oxygen molecules dissociate into atomic oxygen, then the rms speed would be

(A) v
(B) $\sqrt{2}\,v$
(C) $2v$
(D) $2\sqrt{2}\,v$

Answer: (C) $2v$ · The council's preliminary key

Q158 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

The total random kinetic energy of 1 g of helium at 100 K will be ($R = 8.3\ \mathrm{J\,mol^{-1}K^{-1}}$)

(A) $622.50\ \mathrm{J}$
(B) $311.25\ \mathrm{J}$
(C) $155.62\ \mathrm{J}$
(D) $415.00\ \mathrm{J}$

Answer: (B) $311.25\ \mathrm{J}$ · The council's preliminary key

Q159 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

Assertion (A) : The temperature of a gas is a result of the kinetic energy of its molecules.
Reason (R) : Due to kinetic energy, the molecules collide with each other to produce thermal energy

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)
(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(C) (A) is true but (R) is false
(D) (A) is false but (R) is true

Answer: (A) Both (A) and (R) are true and (R) is the correct explanation of (A) · The council's preliminary key

Q160 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

The average translational kinetic energy of O_2 molecules at a particular temperature is 0.048 eV. The average translational kinetic energy of equal number of N_2 molecules at the same temperature is (in eV)

(A) 0.016
(B) 0.032
(C) 0.048
(D) 0.768

Answer: (C) 0.048 · The council's preliminary key

Q161 TS EAMCET 2016 · 15 May · Offline MCQ

Uranium has two isotopes of masses 235 and 238 units. If both of them are present in Uranium hexafluoride gas, find the percentage ratio of difference in rms velocities of two isotopes to the rms velocity of heavier isotope.

(A) 1.64
(B) 0.064
(C) 0.64
(D) 6.4

Answer: (C) 0.64 · Official TGCHE final key

Q162 AP EAMCET 2016 · 29 Apr · Offline MCQ

A cylinder of fixed capacity 67.2 litres contains helium gas at STP. The amount of heat needed to rise the temperature of the gas in the cylinder by 20 °C is ($R = 8.31\ \text{J mol}^{-1}\text{K}^{-1}$)

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(A) 748 J
(B) 374 J
(C) 1000 J
(D) 500 J

Answer: (A) 748 J · The council's preliminary key

Q163 AP EAMCET 2011 · 8 May · Offline MCQ

An insulated cylindrical vessel filled with an insulated piston of negligible weight and negligible thickness at the mid point of the vessel. The cylinder contains a gas at $0^{\circ}\mathrm{C}$. When the gas is heated to $100^{\circ}\mathrm{C}$, the piston moves through a length of 5 cm. Length of the cylindrical vessel in cm is :

(A) 13.65
(B) 27.3
(C) 38.6
(D) 64.6

Answer: (D) 64.6 · Checked by our team

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