

JEE MAIN KINETIC THEORY — MOLECULAR NATURE OF MATTER, BEHAVIOUR OF GASES — PYQS

Max. Marks: 28

Questions: 7

Section A (MCQ) — 5 questions

- Q.1** Two closed vessels of same volume are joined through a narrow tube and both vessels are filled with air of pressure 90 kPa and temperature 400 K. Keeping the temperature of one vessel constant at 400 K the second vessel temperature is raised to 500 K. The final pressure in the vessels is _____ kPa.

[JEE Main 2026 (Online) 6th April Morning Shift]

- (1) 100 (2) 120 (3) 90 (4) 105

Scan or tap for the full solution 

- Q.2** An ideal gas at pressure P and temperature T is expanding such that $PT^3 = \text{constant}$. The coefficient of volume expansion of the gas is _____.

[JEE Main 2026 (Online) 5th April Evening Shift]

- (1) $\frac{2}{T}$ (2) $\frac{1}{T}$ (3) $\frac{4}{T}$ (4) $\frac{3}{T}$

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- Q.3** One gas of n_1 mole of molecules at temperature T_1 , volume V_1 , and pressure P_1 , and another gas of n_2 mole of molecules at temperature T_2 , volume V_2 , and pressure P_2 , are mixed resulting in pressure P and volume V of the mixture. The temperature of the mixture is _____.

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) $\frac{(T_1 + T_2)}{2}$ (2) $\frac{T_1 T_2 P V}{T_2 P_1 V_1 + T_1 P_2 V_2}$
 (3) $\frac{(T_2 P_1 V_1 + T_1 P_2 V_2)}{T_1 T_2 P V}$ (4) $\frac{|T_1 - T_2|}{2}$

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- Q.4** A mixture of carbon dioxide and oxygen has volume 8310 cm^3 , temperature 300 K, pressure 100 kPa and mass 13.2 g. The number of moles of carbon dioxide and oxygen gases in the mixture respectively are _____.

(Assume both carbon dioxide and oxygen gases behave like ideal gases) [$R = 8.31 \text{ J/mol K}$]

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) 0.15 and 0.18 (2) 0.25 and 0.08
 (3) 0.21 and 0.12 (4) 0.13 and 0.20

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- Q.5** There are two vessels filled with an ideal gas where volume of one is double the volume of the other. The large vessel contains the gas at 8 kPa at 1000 K while the smaller vessel contains the gas at 7 kPa at 500 K. If the vessels are connected to each other by a thin tube allowing the gas to flow and the temperature of both vessels is maintained at 600 K, at steady state the pressure in the vessels will be (in kPa).

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 24 (2) 4.4 (3) 18 (4) 6

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Section B (Numerical) — 2 questions

- Q.6** An insulated cylinder of volume 60 cm^3 is filled with a gas at 27°C and 2 atmospheric pressure. Then the gas is compressed making the final volume as 20 cm^3 while allowing the temperature to rise to 77°C . The final pressure is _____ atmospheric pressure.

[JEE Main 2026 (Online) 22nd January Evening Shift]

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- Q.7** A container of fixed volume contains a gas at 27°C . To double the pressure of the gas, the temperature of gas should be raised to _____ $^\circ\text{C}$.

[JEE Main 2025 (Online) 29th January Morning Shift]

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ANSWER KEY

Section A (MCQ) — 5 questions

Ques.	1	2	3	4	5						
Ans.	1	3	2	3	4						

Section B (Numerical) — 2 questions

Ques.	6	7					
Ans.	7	327					