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NEET STATES OF MATTER — PYQS

Max. Marks: 120 **Questions:** 30

Section A (MCQ) — 30 questions

Q.1 Intermolecular forces are forces of attraction and repulsion between interacting particles that will include:

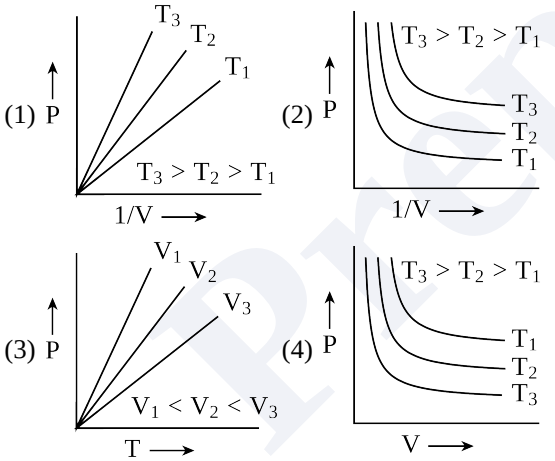
A. dipole-dipole forces
B. dipole-induced dipole forces
C. hydrogen bonding
D. covalent bonding
E. dispersion forces

Choose the most appropriate answer from the options given below: [NEET (UG) 2023]

(1) A, B, C, D are correct
(2) A, B, C, E are correct
(3) A, C, D, E are correct
(4) B, C, D, E are correct

Solution

Q.2 Which amongst the following options is correct graphical representation of Boyle's law? [NEET (UG) 2023]



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Q.3 Which one is not correct mathematical equation for Dalton's Law of partial pressure? Here p = total pressure of gaseous mixture
where p_i = partial pressure of ith gas
χ_i = mole fraction of ith gas in gaseous mixture
$p_i°$ = pressure of ith gas in pure state [NEET (UG) 2022]

(1) $p = p_1 + p_2 + p_3$
(2) $p = n_1\frac{RT}{V} + n_2\frac{RT}{V} + n_3\frac{RT}{V}$
(3) $p_i = \chi_i p$
(4) $p_i = \chi_i p_i°$

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Q.4 A 10.0 L flask contains 64 g of oxygen at 27 °C. (Assume O_2 gas is behaving ideally). The pressure inside the flask in bar is (Given R = 0.0831 L bar K^{-1} mol^{-1}) [NEET (UG) 2022]

(1) 2.5 (2) 498.6 (3) 49.8 (4) 4.9

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Q.5 A vessel contains 3.2 g of dioxygen gas at STP (273.15 K and 1 atm pressure). The gas is now transferred to another vessel at constant temperature, where pressure becomes one third of the original pressure. The volume of new vessel in L is : (Given : molar volume at STP is 22.4 L) [NEET (UG) 2022 (Phase 2)]

(1) 67.2 (2) 6.72 (3) 2.24 (4) 22.4

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Q.6 Four gas cylinders containing He, N_2, CO_2 and NH_3 gases separately are gradually cooled from a temperature of 500 K. Which gas will liquefy first? (Given T_c in K – He : 5.3, N_2 : 126, CO_2 : 304.1 and NH_3 : 405.5) [NEET (UG) 2022 (Phase 2)]

(1) NH_3 (2) He (3) N_2 (4) CO_2

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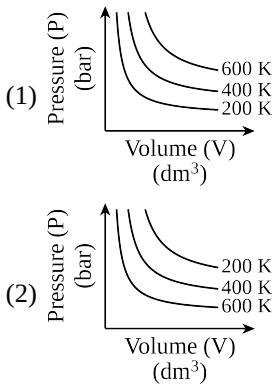
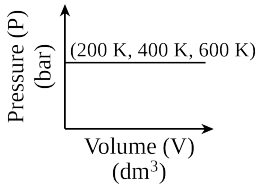
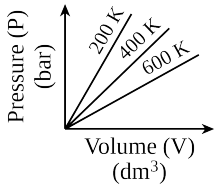
Q.7 Choose the correct option for graphical representation of Boyle's law, which shows a graph of pressure vs. volume of a gas at different temperatures : [NEET (UG) 2021]



(3) 

(4) 

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Q.8 Choose the correct option for the total pressure (in atm.) in a mixture of 4 g O_2 and 2 g H_2 confined in a total volume of one litre at 0°C is :

[Given R = 0.082 L atm mol^{-1} K^{-1}, T = 273 K]

[NEET (UG) 2021]

(1) 26.02 (2) 2.518 (3) 2.602 (4) 25.18

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Q.9 A mixture of N_2 and Ar gases in a cylinder contains 7 g of N_2 and 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is :
[Use atomic masses (in g mol^{-1}) : N = 14, Ar = 40]

[NEET (UG) 2020]

(1) 12 bar (2) 15 bar (3) 18 bar (4) 9 bar

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Q.10 A gas at 350 K and 15 bar has molar volume 20 percent smaller than that for an ideal gas under the same conditions. The correct option about the gas and its compressibility factor (Z) is -

[NEET (UG) 2019]

(1) Z < 1 and attractive forces are dominant
(2) Z < 1 and repulsive forces are dominant
(3) Z > 1 and attractive forces are dominant
(4) Z > 1 and repulsive forces are dominant

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Q.11 Given van der Waals' constant for NH_3, H_2, O_2 and CO_2 are respectively 4.17, 0.244, 1.36 and 3.59, which one of the following gases is most easily liquefied? [NEET 2018]

(1) NH_3 (2) H_2 (3) O_2 (4) CO_2

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Q.12 The correction factor 'a' to the ideal gas equation corresponds to [NEET 2018]

(1) density of the gas molecules
(2) volume of the gas molecules
(3) electric field present between the gas molecules
(4) forces of attraction between the gas molecules

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Q.13 Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape? [NEET 2016 (Phase 1)]

(1) 3/8 (2) 1/2 (3) 1/8 (4) 1/4

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Q.14 A gas such as carbon monoxide would be most likely to obey the ideal gas law at [AIPMT 2015]

(1) low temperatures and high pressures
(2) high temperatures and high pressures
(3) low temperatures and low pressures
(4) high temperatures and low pressures

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Q.15 Dipole-induced dipole interactions are present in which of the following pairs [NEET 2013]

(1) HCl and He atoms (2) SiF_4 and He atoms
(3) H_2O and alcohol (4) Cl_2 and CCl_4

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Q.16 Maximum deviation from ideal gas is expected from [NEET 2013]

(1) $CH_{4(g)}$ (2) $NH_{3(g)}$ (3) $H_{2(g)}$ (4) $N_{2(g)}$

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Q.17 What is the density of N_2 gas at 227 °C and 5.00 atm pressure? (R = 0.082 L atm K^{-1} mol^{-1})

[NEET 2013 (Karnataka)]

(1) 1.40 g/L (2) 2.81 g/L
(3) 3.41 g/L (4) 0.29 g/L

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Q.18 A certain gas takes three times as long to effuse out as helium. Its molecular mass will be

[AIPMT 2012 (Mains)]

(1) 27 u (2) 36 u (3) 64 u (4) 9 u

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Q.19 For real gases van der Waals equation is written as

$$\left(p+\frac{an^2}{V^2}\right)(V-nb)=nRT$$

where a and b are van der Waals constants. Two sets of gases are

(I) O_2, CO_2, H_2 and He

(II) CH_4, O_2 and H_2

The gases given in set-I in increasing order of b and gases given in set-II in decreasing order of a, are arranged below. Select the correct order from the following [AIPMT 2012 (Mains)]

(1) (I) He < H_2 < CO_2 < O_2 (II) CH_4 > H_2 > O_2

(2) (I) O_2 < He < H_2 < CO_2 (II) H_2 > O_2 > CH_4

(3) (I) H_2 < He < O_2 < CO_2 (II) CH_4 > O_2 > H_2

(4) (I) H_2 < O_2 < He < CO_2 (II) O_2 > CH_4 > H_2

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Q.20 50 mL of each gas A and of gas B takes 150 and 200 seconds respectively for effusing through a pin hole under the similar conditions. If molecular mass of gas B is 36, the molecular mass of gas A will be [AIPMT 2012 (Prelims)]

(1) 96 (2) 128.74 (3) 20.25 (4) 64.42

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Q.21 A bubble of air is underwater at temperature 15°C and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is 25°C and the pressure is 1.0 bar, what will happen to the volume of the bubble? [AIPMT 2011 (Mains)]

(1) Volume will become greater by a factor of 1.6.

(2) Volume will become greater by a factor of 1.1.

(3) Volume will become smaller by a factor of 0.70.

(4) Volume will become greater by a factor of 2.5.

Scan or tap for the full solution

Q.22 By what factor does the average velocity of a gaseous molecule increase when the temperature (in Kelvin) is doubled? [AIPMT 2011 (Prelims)]

(1) 2.0 (2) 2.8 (3) 4.0 (4) 1.4

Scan or tap for the full solution

Q.23 Two gases A and B having the same volume diffuse through a porous partition in 20 and 10 seconds respectively. The molecular mass of A is 49 u. Molecular mass of B will be [AIPMT 2011 (Prelims)]

(1) 50.00 u (2) 12.25 u (3) 6.50 u (4) 25.00 u

Scan or tap for the full solution

Q.24 A gaseous mixture was prepared by taking equal moles of CO and N_2. If the total pressure of the mixture was found to be 1 atmosphere, the partial pressure of the nitrogen (N_2) in the mixture is [AIPMT 2011 (Prelims)]

(1) 0.5 atm (2) 0.8 atm (3) 0.9 atm (4) 1 atm

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Q.25 The pressure exerted by 6.0 g of methane gas in a 0.03 m^3 vessel at 129°C is (Atomic masses : C = 12.01, H = 1.01 and R = 8.314 J K^{-1} mol^{-1}) [AIPMT 2010 (Mains)]

(1) 215216 Pa (2) 13409 Pa

(3) 41648 Pa (4) 31684 Pa

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Q.26 If a gas expands at constant temperature, it indicates that [AIPMT 2008]

(1) kinetic energy of molecules remains the same

(2) number of the molecules of gas increases

(3) kinetic energy of molecules decreases

(4) pressure of the gas increases

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Q.27 The surface tension of which of the following liquids is maximum ? [AIPMT 2005]

(1) C_2H_5OH (2) CH_3OH

(3) H_2O (4) C_6H_6

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Q.28 Van der Waals real gas acts as an ideal gas at which conditions? [AIPMT 2002]

(1) High temperature, low pressure

(2) Low temperature, high pressure

(3) High temperature, high pressure

(4) Low temperature, low pressure

Solution

Q.29 The beans are cooked earlier in pressure cooker because [AIPMT 2001]

(1) boiling point increases with increasing pressure

(2) boiling point decreases with increasing pressure

(3) extra pressure of pressure cooker softens the beans

(4) internal energy is not lost while cooking in pressure cooker

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Q.30 Which of the following expressions correctly represents the relationship between the average molar kinetic energy, KE, of CO and N_2 molecules at the same temperature? [AIPMT 2000]

(1) $KE_{CO} = KE_{N_2}$

(2) $KE_{CO} > KE_{N_2}$

(3) $KE_{CO} < KE_{N_2}$

(4) cannot be predicted unless volumes of the gases are given

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**2**	**1**	**4**	**4**	**2**	**1**	**1**	**4**	**2**	**1**	**1**
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	**4**	**3**	**4**	**1**	**2**	**3**	**2**	**3**	**3**	**1**	**4**
Ques.	23	24	25	26	27	28	29	30			
Ans.	**2**	**1**	**3**	**1**	**3**	**1**	**1**	**1**			

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