DAILY PRACTICE PROBLEM
OF
PHYSICAL CHEMISTRY
FOR NEET

BY

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DPP -1

1. A sample of gas occupies 10 L under a pressure of 1 atm. What will be its volume if the pressure is increased to 2 atm? Assuming that temperature of the gas sample does not change

(1) 2 L (2) 5 L (3) 10 L (4) 1 L

Ans. (2)

2. A gas at a pressure of 5 atm is heated from 0° to 546°C and simultaneously compressed to $\frac{1}{3}$rd of it original volume. Hence final pressure is

(1) 10 atm (2) 45 atm (3) 30 atm (4) 5 atm

Ans. (2)

3. How much should the pressure be increased in order to decrease the volume of a gas by 5% at a constant temperature?

(1) 5% (2) 5.26% (3) 10% (4) 4.26%

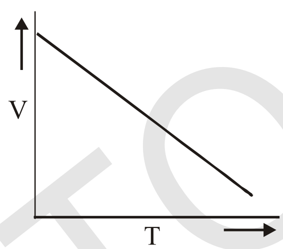
Ans. (2)

4. When the temperature is raised through 1°C the volume is increased by $\frac{1}{273}$ th times of the original volume. This is

(1) Boyle's Law (2) Charles' Law (3) Avogadro Law (4) Graham's Law

Ans. (2)

5. Which curve shows Charle's law ?

(1)


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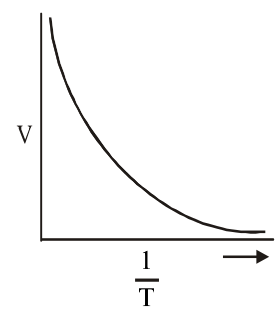

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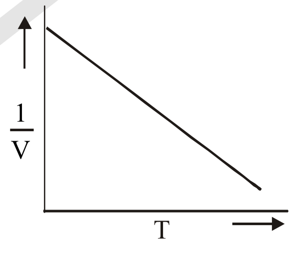

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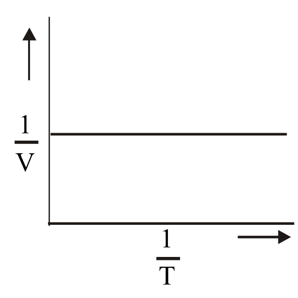
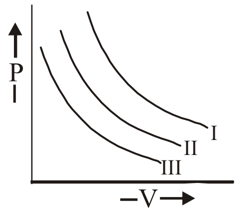


Ans. (2)

6 . I, II, III are three isotherms respectively at T_1, T_2, T_3. Temperature will be in order



(1) $T_1 = T_2 = T_3$ (2) $T_1 < T_2 < T_3$ (3) $T_1 > T_2 > T_3$ (4) $T_1 > T_2 = T_3$

Ans. (3)

7 . To what temperature must a neon gas sample be heated to double its pressure in the initial volume of gas at 75°C is decreased by 15.0% ?

(1) 592 K (2) 492 K (3) 542 K (4) 642 K

Ans. (1)

8 . When a gas filled in a closed vessel is heated through 1°C, its pressured is increased by 0.4%. The initial temperature of the gas was

(1) 250 K (2) 2500 K (3) 250°C (4) 25°C

Ans. (1)

9 . "One gram molecules of a gas at N.T.P. occupies 22.4 litres". This fact was derived from

(1) Dalton's theory (2) Avogadro's hypothesis

(3) Berzelius hypothesis (4) Law of gaseous volume

Ans. (2)

10. A sample of gas at 1.2 atm and 27°C heated at constant pressure to 57°C. Its final volume is found to be 4.75 litres. What was its original volume ?

(1) 4.32 litres (2) 5.02 litres (3) 4.22 litres (4) None of these

Ans. (1)

11. If the density of a certain gas at 30°C and 768 torr is 1.35 kg/m^3 its density at STP would be

(1) 1.48 kg/m^3 (2) 1.58 kg/m^3 (3) 1.25 kg/m^3 (4) 1.4 kg/m^3

Ans. (1)

12. A vessel has 6 g of oxygen at a presure P and temperature 400 K. A small hole is made in it so that O_2 leaks out. How much O_2 leaks out if the pressure is P/2 and temperature 300 K ?

(1) 5 g (2) 4 g (3) 2 g (4) 3 g

Ans. (3)

13. What percent of a sample of nitrogen must be allowed to escape if its temeprature, pressure and volume are to be changed from 220°C, 3 atm and 1.65 litre to 110°C, 0.7 atm and 1.00 litre respectively ?

(1) 81.8% (2) 71.8% (3) 76.8% (4) 86.8%

Ans. (1)

14. The density of neon will be highest at

(1) STP (2) 0°C and 2 atm (3) 273°C and 1 atm (4) 273°C and 2 atm

Ans. (2)

15. Which of the following relation is correct for an ideal gas ?

(1) $\frac{V}{n} = \frac{P}{RT}$ (2) $\frac{MV}{m} = \frac{P}{RT}$ (3) $\frac{d}{M} = \frac{P}{RT}$ (4) All of these

Ans. (3)

DPP - 2

1. 2 g of gas A introduced in a evacuated flask at 25°C. The pressure of the gas is 1 atm. Now 3 g of another gas B is introduced in the same flask so total pressure becomes 1.5 atm. The ratio of molecular mass A and B is

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

Ans. (2)

2. Which mixture of gases at room temperature does not obey Dalton's law of partial pressure ?

(1) NO_2 and O_2 (2) NH_3 and HCl (3) CO and CO_2 (4) SO_2 and SO_3

Ans. (2)

3. The partial pressure of hydrogen in a flask containing 2 g H_2 and 32 g SO_2 is

(1) $1/16^{th}$ of total pressure (2) $1/9^{th}$ of total pressure

(3) $2/3^{rd}$ of total pressure (4) $1/8^{th}$ of total pressure

Ans. (3)

4. The two bulbs of volume 5 litre and 10 litre containing an ideal gas at 9 atm and 6 atm respectively are connected. What is the final pressure in the two bulbs if the temperature remains constant ?

(1) 15 atm (2) 7 atm (3) 12 atm (4) 21 atm

Ans. (2)

5. Two non-reactive gases A and B are present in a container with partial pressure 200 and 180 mm of Hg. When a third non-reactive gas C is added then total pressure becomes 1 atm then mole fraction of C will be

(1) 0.75 (2) 0.5 (3) 0.25 (4) cannot be calculated

Ans. (2)

6. The rates of diffusion of gases A and B of molecular weights 100 and 81 respectively are in the ratio of

(1) 9 : 10 (2) 10 : 9 (3) 100 : 18 (4) 81 : 100

Ans. (1)

7. 100 mL of O_2 gas diffuses in 10 s. 100 mL of gas 'X' diffuses in 't' sec. Gas 'X' and time 't' can be

(1) H_2, 2.5 s (2) SO_2, 16 s (3) CO, 10 s (4) He, 4 s

Ans. (1)

8. Pressure exerted by a perfect gas is equal to

(1) Mean kinetic energy per unit volume

(2) Half of the mean kinetic energy per unit volume

(3) Two thirds of mean kinetic energy per unit volume

(4) One third of mean kinetic energy per unit volume

Ans. (3)

DPP - 3

1. For non-zero value of force of attraction between gas molecules, gas equation will be

(1) $PV = nRT - \frac{n^2a}{V}$ (2) $PV = nRT + nbP$ (3) $P = \frac{nRT}{V-b}$ (4) $PV = nRT$

Ans. **(1)**

2. What is the ratio of the average molecular kinetic energy of UF_6 to that of H_2 both at 300 K ?

(1) 1 : 1 (2) 349 : 2 (3) 2 : 349 (4) None of these

Ans. **(1)**

3. If pressure of a fixed quantity of a gas is increased 4 times keeping the temperature constant, the r.m.s. velocity will be

(1) 4 times (2) 2 times (3) Same (4) $\frac{1}{2}$ times

Ans. **(3)**

4. The total kinetic energy in joules of the molecules in 8 g of methane at 27°C ?

(1) 3741.30 J (2) 935.3 J (3) 1870.65 J (4) 700 J

Ans. **(3)**

5. At what temperature the RMS velocity of oxygen will be same as that of methane at 27°C ?

(1) 54°C (2) 327 K (3) 600 K (4) 573 K

Ans. **(3)**

6. The temperature at which the root mean square velocity of SO_2 molecules is the same as that of O_2 at 27°C is

(1) 600°C (2) 300°C (3) 327°C (4) 27°C

Ans. **(3)**

7. At what temperature will the total KE of 0.3 mol of He be the same as the total KE of 0.4 mol of Ar at 400 K ?

(1) 533 K (2) 400 K (3) 346 K (4) 300 K

Ans. **(1)**

8. The time taken for a certain volume of gas to diffuse through a small hole was 2 min. Under similar conditions an equal volume of oxygen took 5.65 minute to pass. The molecular mass of the gas is

(1) 32.0 (2) 11.33 (3) 4.0 (4) 8.0

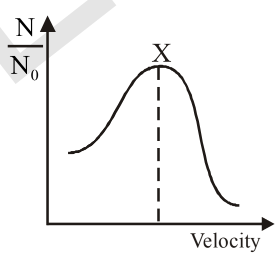
Ans. **(3)**

9. The r.m.s. velocity of hydrogen is $\sqrt{7}$ times the r.m.s. of nitrogen. If T is the temperature of the gas then

(1) $T_{H_2} = T_{N_2}$ (2) $T_{H_2} > T_{N_2}$ (3) $T_{H_2} < T_{N_2}$ (4) $T_{H_2} = \sqrt{7}T_{N_2}$

Ans. **(3)**

10. Distribution of fraction of molecules with velocity is represented in the figure



Velocity corresponding to point X is

(1) $\sqrt{\frac{2RT}{M}}$ (2) $\sqrt{\frac{3RT}{M}}$ (3) $\sqrt{\frac{8RT}{\pi M}}$ (4) $\sqrt{\frac{2RT}{\pi M}}$

Ans. **(1)**

11. If saturated vapours are compressed slowly at constant temperature to half the initial volume, the vapour pressure will

(1) Becomes double (2) Becomes 4 times (3) Becomes half (4) Remains unchanged

Ans. **(4)**

DPP -4

1. When there can be more deviation in the behaviour of a gas from the ideal gas equation PV = nRT
(1) At high temperature and low pressure
(2) At low temperature and high pressure
(3) At high temperature and high pressure
(4) At low temperature and low pressure

Ans. (2)

2. In van der W l's equation of state for a non-ideal gas, the term that accounts for intermolecular forces is

(1) V – 1 (2) RT (3) $\left[P+\frac{a}{V^2}\right]$ (4) $(RT)^{-1}$

Ans. (3)

3. van der W l's constant 'a' has the dimensions of
(1) Mol L^{-1} (2) Atm L^2 mol^{-2} (3) Litre mol^{-1} (4) Atm L mol^{-2}

Ans. (2)

4. van der W l found that two assumptions made by kinetic theory of gases were wrong, one of them is that gas molecules are
(1) Very large
(2) Compressible
(3) Point particles without significant volume
(4) Spherical

Ans. (3)

5. Which one is correct relation for 1 mole of real gases ?

(1) $\left(P+\frac{a}{V^2}\right)(V-b)=RT$ (2) $P=\frac{RT}{(V-b)}-\frac{a}{V^2}$

(3) $\left(P+\frac{a}{V^2}\right)=\frac{(R+T)}{(V-b)}$ (4) Both (1) & (2)

Ans. (4)

6. For a real gas, Z shows
(1) Z < 1, gas is less compressible
(2) Z > 1, gas is more compressible
(3) $Z = \infty$ m for an ideal gas
(4) $PV \neq nRT$, for real gas

Ans. (4)

7. The compressibility factor 'Z' for the gas is given by

(1) $Z = PV_{obs}$ (2) $Z=\frac{PV_{obs}}{nRT}$ (3) Z = nRT (4) Z = PV.nRT

Ans. (2)

8. Which of the following gas always shows positive deviation from ideal gas behaviour ?
(1) H_2 (2) CO_2 (3) NH_3 (4) CH_4

Ans. (1)

9. For non-zero value of force of attraction between gas molecules, gas equation will be

(1) $PV = nRT - \frac{n^2a}{V}$ (2) $PV = nRT + nbP$ (3) $P = \frac{nRT}{V-b}$ (4) $PV = nRT$

Ans. (1)

10. T_c and P_c of a gas are 400 K and 41 atms. respectively. The V_c is

(1) $\frac{400R}{41}$ (2) $\frac{150R}{41}$ (3) $\frac{41R}{400}$ (4) $\frac{300R}{41}$

Ans. (2)

11. Boyle's temperature of a gas is related to van der W l's constants as

(1) $T_i = T_b$ (2) $2T = T_b$ (3) $T_i = 2T_b$ (4) $T_i = \sqrt{T_b}$

Ans. (3)

12. The critical temperature of a gas is related to van der W l's constants as

(1) $T_c = 3b$ (2) $T_c = \frac{a}{27b^2}$ (3) $T_c = \frac{8a}{27bR}$ (4) $T_c = \frac{27bR}{8a}$

Ans. (3)

13. Boyle's temperature T_b is equal to

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

Ans. (2)

14. The point at which densities of a substance in gaseous as well as in liquid state are same called

(1) Critical point (2) Isoelectric point (3) Isotonic point (4) Ideal point

Ans. (1)