GASEOUS STATE

SINGLE CORRECT OPTION TYPE

1. A sample of a gas occupies 10 L under a pressure of 1 atm. What will be its volume if the pressure is increased to 2 atm? (Assume that the temperature of the gas sample does not change).
(A) 5 L (B) 10 L (C) 2.5 L (D) 15 L

2. A sample of a gas occupies 600 mL at $27°C$ and 1 atm. What will be the volume at $127°C$ if the pressure is kept constant?
(A) 400 mL (B) 800 mL (C) 300 mL (D) 600 mL

3. A gas cylinder containing cooking gas can with stand a pressure of 14.9 atm. The pressure gauge of the cylinder indicates 12 atm at $27°C$. Due to a sudden fire in the building, the temperature starts rising. At what temperature will the cylinder explode?
(A) $79.5°C$ (B) $89.5°C$ (C) $99.5°C$ (D) $109.5°C$

4. A 1000 ml sample of a gas at $-73°C$ and 2 atm is heated to $123°C$ and pressure is reduced to 0.5 atm. What will the final volume?
(A) 2000 ml (B) 4000 ml (C) 6000 ml (D) 8000 ml

5. What is the pressure of HCl gas at $-40°C$ if its density is $8\ kg\cdot m^{-3}$? $\left(R = 8.314\ J\cdot k^{-1}\cdot mol^{-1}\right)$
(A) $4.25\times10^5 Pa$ (B) $1.25\times10^5 Pa$ (C) $7.25\times10^5 Pa$ (D) $10.25\times10^5 Pa$

6. A balloon of diameter 20 m weighs 100 kg. Calculate its payload if it is filled with He-gas at 1 atm and $27°C$? [Density of air is $1.2\ kg\cdot m^{-3}$, $R = 0.082 L\cdot atm\cdot mol^{-1}\cdot K^{-1}$]
(A) $4.25\times10^3 kg$ (B) $2.25\times10^3 kg$ (C) $6.25\times10^3 kg$ (D) $8.25\times10^3 kg$

7. At STP density of oxygen is $1.43 g\cdot L^{-1}$. Its density at $17°C$ and 800 torr will be _____ $g\cdot L^{-1}$.
(A) 1 (B) 1.42 (C) 1.65 (D) 1.84

8. An open flask contains air at $27°C$. The temperature at which it should be heated so that $1/3^{rd}$ of air measured at $27°C$ escapes out is _____
(A) $133°C$ (B) $155°C$ (C) $177°C$ (D) $199°C$

9. A mixture of CO and CO_2 is found to have a density of $1.5\ gL^{-1}$ at $30°C$ and 730 torr. The composition of CO_2 in the mixture is _____.
(A) 12.18% (B) 87.82% (C) 32.18% (D) 67.82%

10. Total pressure exerted by 1.6 g methane and 2.2 g CO_2 contained in a 4 L flask at $27°C$ is ____ atm.
(A) 0.62 (B) 0.92 (C) 0.32 (D) 0.12

11. $20\ dm^3$ of SO_2 diffuses through a porous portion in 60 s. The volume of O_2 that diffuses under similar conditions in 30 seconds is _____ dm^3.
(A) 14.1 (B) 10.1 (C) 8.1 (D) 5.1

12. The reaction between gaseous NH_3 and HBr produces a white solid NH_4Br. Suppose a small quantity of gaseous NH_3 and gaseous HBr are introduced simultaneously into opposite ends of an open tube which is 1 m long. The distance of white solid formed from the end which was used to introduce NH_3 is _____ cm.

(A) 48.55 (B) 68.55 (C) 31.45 (D) 51.45

13. 1-mole of N_2 gas at 0.8 atm takes 38 seconds to diffuse through a pin hole where as 1-mole of an unknown compound of xenon with fluorine at 1.6 atm takes 57 seconds to diffuse through the same hole. The molecular formula of compound is _____

(A) XeF_2 (B) XeF_4 (C) XeF_6 (D) XeF_8

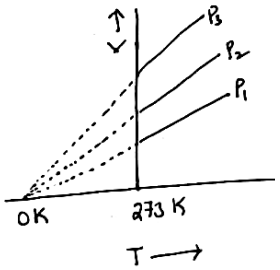
14. Which of the following mixture of gases at room temperature doesn't follow Dalton's law of partial pressures?

(A) NO_2 and O_2 (B) CO and CO_2 (C) SO_2 and O_2 (D) NH_3 and HCl

15. The total pressure of a gaseous mixture of 2 moles of A, 3 moles of B, 5 moles of C and 10 moles of D present in a vessel is _____ atm, if the partial pressure of c is 1.5 atm. (Assume the ideal behaviour of the gases)

(A) 9 (B) 15 (C) 3 (D) 6

16. The volume-temperature graphs of a given mass of an ideal gas at constant pressures are shown below. The correct order of pressures is _____.



(A) $P_1 > P_2 > P_3$ (B) $P_1 > P_3 > P_2$

(C) $P_2 > P_3 > P_1$ (D) $P_2 > P_1 > P_3$

17. Charles law is represented mathematically as

(A) $V_t = KV_0t$ (B) $V_t = \frac{KV_0}{t}$ (C) $V_t = V_0\left[1+\frac{273}{t}\right]$ (D) $V_t = V_0\left[1+\frac{t}{273}\right]$

18. 5 grams each of the following gases at $87^\circ C$ and 750 mm pressure are taken. Which of the following will have the least volume?

(A) HI (B) HBr (C) HCl (D) HF

19. A bottle of dry NH_3 and a bottle of dry HCl connected through a long tube are opened simultaneously at both the ends. The white ring first formed will be

(A) at the centre of the tube (B) near the ammonia tube

(C) near the HCl bottle (D) throughout the length of the tube

20. 0.5 mole of each H_2, SO_2 and CH_4 are kept in a container. A hole was made in the container. After 3 hours, the order of partial pressures in the container will be

(A) $P_{SO_2} > P_{CH_4} > P_{H_2}$ (B) $P_{H_2} > P_{SO_2} > P_{CH_4}$

(C) $P_{H_2} > P_{CH_4} > P_{SO_2}$ (D) $P_{SO_2} > P_{H_2} > P_{CH_4}$

NUMERICAL BASED

21. A gas with molecular formula C_nH_{2n+2} diffuses through a porous plug at a rate $1/6^{th}$ of the rate of diffusion of H_2 - gas under similar conditions. Then n – value of the molecular formula is _____.

22. Two gas bulbs A and B are connected by a tube having a stopcock. Bulb A has a volume of 100 ml and contains H_2. After opening the gas from A to the evacuated bulb B, the pressure falls down to 40%. If the volume of bulb – B is 50x mL then x is _____.

23. 56 grams of N_2 and 96 grams of O_2 are mixed isothermally at a total pressure of 10 atm. If ratio of partial pressures of N_2 to O_2 is x:y, then $x+y$ is _____ .

24. CH_4 diffuses 2 times faster than a gas A. If the number of molecules present in 32 grams of A is xN_A, where N_A is Avogadro's number. Then x is _____ .

25. At $O^{\circ}C$ and 1 atm pressure a gas occupies 100 cc volume. If the pressure is increased to 1 ½ time and temperature is increased by 1/3 of absolute temperature, then final volume of the gas will be ____ cc.

KEY

1.	A	**2.**	B	**3.**	C	**4.**	D	**5.**	A
6.	A	**7.**	B	**8.**	C	**9.**	D	**10.**	B
11.	A	**12.**	B	**13.**	C	**14.**	C	**15.**	D
16.	A	**17.**	D	**18.**	A	**19.**	C	**20.**	A
21.	5	**22.**	3	**23.**	5	**24.**	0.5	**25.**	88.9

❇ *Wish You all the Best* ❇