CHEMISTRY

JEE MAIN AND ADVANCED

STATES OF MATTER

Example

1. What is the necessary condition for hydrogen bonding?

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2. Which interactions are responsible for the liquefaction of helium gas?

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3. What is the S.I unit of pressure?

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4. What is the value of $27^{\circ} C$ in kelvin temperature?

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5. Which state of matter has least intermolecular forces of attraction?

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6. Why does a balloon burst when we try to squeeze it?

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7. The pressure of gas A (P_A) is 3.0 atm when it occupies 5L of the volume. Calculate the final

pressure when it is compressed to 3L volume at constant temperature.

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8. At what temperature will a given mass of a gas occupy a volume of 200L, if it occupies a volume of 260L at a temperature of $30^{\circ}C$, pressure remaining constant?

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9. 450mL of oxygen gas at $20^\circ C$ is heated to $50^\circ C$. What is the new volume of the gas at constant pressure?

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10. The cylinder of propane gas at $25^\circ C$ exerted a pressure of 10 atmosphere. When exposed to sunlight it warmed upto $45^\circ C$. What pressure does the container now experience?

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11. Calculate the value of proportionality constant k for 1 mole of a gas which occupies 22.4L of volume under the given conditions of temperature and pressure.

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12. $30cm^3$ of a gas at 2.02 atm and $25^\circ C$ was compressed to $15cm^3$ at $35^\circ C$. Calculate the final pressure of the gas.

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13. A vessel of 5 litre capacity maintained at $27^\circ C$ was filled with 16g of $O_2 gas$. Calculate the pressure of the gas in atmospheres in the container.

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14. Calculate the density of CO_2 gas which has pressure 745 mm at $65^\circ C$.

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15. The volumes of ozone and chlorine diffusing in the same time are $35mL$ and $29mL$, respectively. If the molecular weight of chlorine is 71, calculate the molecular weight of ozone.

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16. A fluoride of phosphorous in gaseous state was found to diffuse 2.12 times more slowly than nitrogen under similar conditions. Calculate the molecular mass and molecular formula of this fluoride which contains one atom of phosphorous per molecule.

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17. Which gas will effuse faster, NH_3 or CO? What are their relative rates of effusion?

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18. 1.40L of an unknown gas requires 57 second to diffuse and the same volume of N_2 gas takes 84 second to diffuse at the same temperature and pressure. What is the molecular mass of the unknown gas?

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19. A mixture of N_2 and a gas 'X' at 300K, is allowed to diffused into empty container of 5.0 L volume. The pressure inside the vessel recorded as 5.5 atm. If 0.9 moles of N_2 is present in the mixture then calculate molecular mass of 'X'

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20. Rate of diffusion of gas A is $\frac{1}{2}$ that of gas 'B'. If molecular mass of gas A is 16 than calculate molecular mass of gas 'B'.

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21. A classroom consists 10 equidistant bench. If nitrous oxide (laughing gas) is released from the first desk and tear gas $(C_6H_{11}Obr)$ is released from last desk. Find out the desk from 1st at which students starts laughing and weeping simultaneously.

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22. A vessel contains O_2 and H_2 in 2 : 1 molar ratio at 10 atm pressure then calculate ratio of their rate

of diffusion.

A. 1:4

B. 1:8

C. 1:2

D. 1:6

Answer: 1:2

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23. 400mL of CO_2 gas at 0.892 bar pressure and 800mL of CH_4 gas at 0.921 bar pressure are put

into a 2L flask. Calculate the total pressure of the mixture assuming temperature is kept constant.

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24. Calculate the root mean square, average and most probable speeds of oxygen molecules at $27^{\circ} C$.

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25. Calculate RMS and average velocity of nitrogen at NTP .

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26. Calculate RMS velocity of ethane at 27° C and 720 mm of Hg pressure.

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27. Calulate RMS velocity of oxygen is 6.431 g og it occupies 5L at 750 mm Hg.

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28. The average speed of an ideal gas molecule at $27^\circ C$ is $0.3m, \sec^{-1}$. The average speed at $927^\circ C$

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29. Calculate the temperature of which CO_2 has the same RMS velocity as that of O_2 at S.T.P

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30. Critical temperatuer of oxygen and nitrogen gas is 154.3 K and 126.0 K respectively. Which of these

gases has higher magnitude of intermolecular forces between them ?

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31. On what two factors viscosity of liquid depends ?

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32. What are the SI unit and cgs unit of viscosity . Give the relation between them.

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33. Boiling shows what type of phenomenon ?

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Exercise

1. The numerical value of N/n (where N is the number of molecules in a give sample of gas and n is the number of moles of gas) is

A. 8.314

B. 1.66×10^{-19}

C. 6.023×10^{23}

D. 0.082

Answer:

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2. Which one of the following is not correct about universal gas constant R?

A. $R = 0.0821 m^3 \ \text{atm} \ K^{-1} mol^{-1}$

B. $R = 8.314 kJ K^{-1} mol^{-1}$

C. $R = 1.987 k.\ cal^{\circ} C^{-1} mol^{-1}$

D. All of these

Answer: D

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3. The partial pressure of a dry gas is

A. Less than that of wet gas

B. Greater than that of wet gas

C. Equal to that of wet gas

D. None of these

Answer:

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4. A cylinder is filled with a gaseous mixture containing equal masses of CO and N_2. The ratio of their partial pressure is

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:3$

Answer:

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5. A gas in an open container is heated from $27^\circ C$ to $127^\circ C$ The fraction of the original amount of gas remaining in the container will be .

A. $\frac{3}{4}$

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{1}{8}$

Answer:

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6. Absolute zero is -

A. $-273^{\circ} C$

B. Zero K

C. Temperature at which no substance exists in gaseous state

D. All of these

Answer: D

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7. A gas occupies 20 litre of volume under STP. What will be its volume if the pressure is increased four times keeping the temperature constant?

A. 20 L

B. 80 L

C. 5 L

D. 4 L

Answer:

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8. Density of a gas at 300 K and 210 torr is $0.434gL^{-1}$. What is its molar mass?

A. 14.78 g/mole

B. 73.43 g/mole

C. 36.68 g/mole

D. 43.28 g/mole

Answer:

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9. The rate of diffusion of a gas is proportional to

A. $\frac{P}{\sqrt{d}}$

B. $\frac{P}{d}$

C. $\sqrt{\frac{P}{d}}$

D. $\frac{\sqrt{P}}{d}$

Answer:

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10. The ratio of average speed of an O_2 molecule to the rms speed of N_2 molecule at the same temperature is

A. $\left(\frac{3\pi}{7}\right)^{1/2}$

B. $\left(\frac{7}{3\pi}\right)^{1/2}$

C. $\left(\frac{3}{7\pi}\right)^{1/2}$

D. $\left(\frac{7\pi}{3}\right)^{1/2}$

Answer:

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11. The ratio between the root mean square speed of H_2 at $50K$ and that of O_2 at $800K$ is

A. 4

B. 2

C. 1

D. $\frac{1}{4}$

Answer:

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12. Which of the following postulate of kinetic theory of gas is responsible for deviation from ideal behaviour?

A. kinetic energy of the gas molecules increase with increase in temperature

B. Collisions among the gas molecules are perfectly elastic

C. There is no forces of attraction or repulsion among gas molecules

D. Molecules in a gas follow zig-zag path

Answer: C

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13. What is average kinetic energy of 1 mole of SO_2 at $300K$?

A. 4578 J/mol

B. 3134 J/mol

C. 3741 J/mol

D. 4173 J/mol

Answer: C

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14. If a gas expands at constant temperature

A. Its pressure increases

B. Kinetic energy of the molecules increases

C. Kinetic energy of the molecules remains the same

D. Number of molecules of the gas increases

Answer:

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15. If pressure of a gas increases upto nine times keeping temperature constant then its rms velocity will become

A. 9 times

B. 3 times

C. Remains same

D. $\frac{1}{3}$ time

Answer:

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16. V ml of H_2 gas diffuses through a small hole in a container in time t_1. How much time will be required by oxygen gas for the diffusion of same volume?

A. $2t_1$

B. $4t_1$

C. $\frac{1}{(2)^{t_1}}$

D. $\frac{1}{(4)^{t_1}}$

Answer: B

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17. Average kinetic energy per molecule of a gas is related to its temperature as $\overline{KE}$=..... .

A. $\overline{KE} = \frac{1}{3}m\nu^2$

B. $\overline{KE} = \frac{3}{2}RT$

C. $\overline{KE} = \frac{3}{2}kT$

D. Both (2) & (3)

Answer:

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18. Pressure exerted by one mole of an ideal gas kept in a vessel of 'V' L having root mean square speed of molecules 'v' and 'm' mass of each molecule is correctly given by the equation

A. $P = \frac{1}{2}\frac{N_A}{V}mv^2$

B. $P = \frac{1}{3}\frac{N_A}{V}mv^2$

C. $P = \frac{2}{3}\frac{N_A}{V}mv^2$

D. $P = \frac{3}{2}\frac{N_A}{V}mv^2$

Answer: B

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19. At critical temperature pressure and volume. The compressibility factor (Z) is-

A. $\frac{8}{3}$

B. $\frac{5}{3}$

C. $\frac{3}{5}$

D. $\frac{3}{8}$

Answer: D

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20. The liquefaction behaviour of temporary gases like CO_2 approaches that of N_2. O_2 (perma-nent gases) as we go -

A. Below absolute zero

B. Above absolute zero

C. Above critical temperature

D. Below critical temperature

Answer: C

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21. The value of van der waal's constant 'a' for gases O_2, N_2, NH_3 and CH_4 are x, y, z and c respectively, where $z > c > y > x$. The gas which can most easily be liquified is

A. O_2

B. N_2

C. NH_3

D. CH_4

Answer: C

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22. Which of the following is correct?

A. For H_2 and He, $z < 1$, and molar volume at STP is less than 22.4 L

B. For H_2 and He, $z < 1$, and molar volume at STP is greater than 22.4 L

C. For H_2 and He, $z > 1$, and molar volume at STP is less than 22.4 L

D. For H_2 and He, $z > 1$, and molar volume at STP is greater than 22.4 L

Answer: D

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23. Which of the following is correct?

A. A real gas approaches ideal gas behaviour at low pressure and high temperature

B. Liquification of a real gas is possible at low temperature and high pressure

C. Both of them

D. None of them

Answer: C

24. A real gas has critical temperature and critical pressure as $40^{\circ}C$ and 10 atm respectively, then liquification of gas is possible at

A. $50^{\circ}C$ and 8 atm

B. $45^{\circ}C$ and 8 atm

C. $25^{\circ}C$ and 12 atm

D. $45^{\circ}C$ and 12 atm

Answer: C

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25. The ratio of Boyle's temperature and critical temperature for a gas is:

A. $\frac{8}{27}$

B. $\frac{27}{8}$

C. $\frac{1}{2}$

D. $\frac{2}{1}$

Answer:

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26. Van der Waal's equation at high pressure for 1 mole is

A. $PV + \frac{a}{V} = RT$

B. PV = RT

C. P(V+b) = RT

D. P(V-b) = RT

Answer:

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27. The excluded volume of molecule in motion is ..... times, the actual volume of a molecule in rest

A. 2

B. 4

C. 3

D. 0.5

Answer:

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28. Inversion temperature is

A. $\frac{a}{Rb}$

B. $\frac{2a}{Rb}$

C. $\frac{Rb}{a}$

D. $\frac{2Rb}{a}$

Answer:

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29. Which of the following increases with the increase in temperature in case of a liquid?

A. Vapour pressure

B. Surface tension

C. Viscosity

D. All of these

Answer: A

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30. The condition of free vapourisation throughout the liquid is called

A. Freezing

B. Melting

C. Evaporation

D. Boiling

Answer: D

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31. If pressure is 1 bar, then the boiling temperature is called

A. Normal boiling point

B. Standard boiling point

C. Abnormal boiling point

D. Simple boiling point

Answer: B

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32. Liquids at higher altitude boil at (in comparison to sea level) -

A. Lower temperature

B. Higher temperature

C. Same temperature

D. Cannot say

Answer:

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33. Choose the correct statement(s)

A. Boiling does not occur when liquid is heated in a closed vessel

B. On heating continusoly vapour pressure of a liquid increases in a closed vassei

C. Liquids may be considered as a continuation of gas phase into a region of small volume

and very strong molecular attractions

D. All of these

Answer: D

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34. Standard boilling points of the liquid is slightly

A. Lower than the normal boiling point

B. Higher than the normal boilling point

C. Same as the normal boiling point

D. May lower or higher than the normal boiling point

Answer: A

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35. The rise of a liquid in a capillary tube is due to :

A. Boiling

B. Evaporation

C. Surface tension

D. Viscosity

Answer:

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36. Which of the following is the unit of coefficient of viscosity

A. $N\frac{s}{m^{-2}}$

B. $Poise$

C. $kgm^{-1}s^{-1}$

D. All of these

Answer: D

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37. As the temperature rises viscosity of liquids

A. Increases

B. Decreases

C. Remains same

D. Increases of decreases depending on the nature of liquid

Answer:

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38. Which of the following is the most viscous liquid ?

A. Water

B. Alcohol

C. Glass

D. Ethylene glycol

Answer: C

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Try Yourself

1. Which intermolecualr forces are present between two HCl molecules ?

A. Induced dipole induced dipole

B. Ion dipole interaction

C. Electrostatic force of attraction

D. Diople dipole

Answer: D

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2. What types of bonding is present between water molecules ?

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3. Give the conversion from atm unit to bar units of pressure

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4. Calculate the number of moles of 22g of CO_2 gas enclosed in a cylinder.

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5. How is pressure of a gas defined ?

A. Mass per unit area

B. Mass per unit volume

C. Force per unit area

D. Mass per unit acceleration

Answer: C

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6. Convert 2 cubic metres into qbic decimetre scale of volume -

A. 1000 cubic decimeter

B. 4000 cubic decimeter

C. 2000 cubic decimeter

D. 200 cubic decimeter

Answer: C

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7. Which state of matter has maximum thermal enegy ?

A. Solid

B. Liquid

C. Gas

D. None of these

Answer: C

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8. A ballon is filled with hydrogen at room temperature. It will burst if pressure exceeds 0.2bar. If at I bar pressure, the gas occupies $2.27L$ volume, up to what volume can the balloon be expanded?

9. What will be the volume of a given mass of a pressure of 50 cm of Hg., if the occupics 260 mL at a pressure of 98 cm of Hg keeping the temperature constant.

A. 520ml

B. 620ml

C. 510ml

D. 610ml

Answer: C

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10. What is the minimum pressure required to compress $460dm^2$ of air at 2 bar to $230dm^3 at 30^\circ C$?

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11. At what temperature $25dm^3$ of oxygen at 283 K is heated to make its volume $30dm^3$?

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12. On a ship sailing in pacific ocean where temp. is 23.4° C A balloon is filled with 2L air, what will be the volume of balloon where the ship reaches Indian ocean where temp is 26.1° C :-

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13. Calculate the resulting temperature chagne if a 20 mL of hydrogen at $15^{\circ} C$ is isobarically expanded to 21.38 m L

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14. Which scale is known as thermodynamic scale of temperature ?

A. Celcius scale

B. Fahrenheit scale

C. kelvin scale

D. None

Answer: kelvin scale

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15. A container is filled with hydrogen gas at a pressure of 15 atm at $15^{\circ}C$. At what temperature will the pressure inside the container be 30 atm ?

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16. State Dalton's law-

A. the total pressure of gas is directly proportional to mole fraction of gas

B. the total pressure of a mixture of gases is equal to sum of temperature of individual molecule

C. the total pressure of mixture of gases is equal to the sum of partial pressure of individual component gases

D. none

Answer: C

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17. How is density of gas related to its molar mass ?

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18. At $25^{\circ}C$ and 760 mm of Hg pressure a gas occupies 600 mL volume. What will be its pressure at a height where temperature is $10^{\circ}C$and volume of the gas is 640 mL.

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19. The density of gas is $1.27gL^{-1}$ at $50^{\circ}C$ and 0.987×10^{5} Pa. Calculate ist molar mass.

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20. 1 g of hellium gas is confined in a two liter flask under a pressure of 2.05 atm What is its temperatue ?

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21. Calculate the molar volume of gas at STP -

A. 22.8 ml

B. 25.8 ml

C. 22.4 ml

D. 11.2 ml

Answer: C

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22. 30 litre of ammonia gas at $30^{\circ}C$ and 40 atm pressure is allowed to expand in a space of 40 litre capacity and pressure becomes 20 atm. Calculate the drop in temperature.

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23. Calculate the pressure of a gas whose molar mass is $29.3gmol^{-1}$ having density $1.29kgm^{3}$ at 273 K temperature

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24. A neon-dioxygen mixture contains 70.6 g dioxygen and 167.5 g neon. If pressure of the mixture of gases in the cylinder is 25 bar. What is the partial pressure of dioxygen and neon in the mixture ?

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25. Two gases A and B having molecular weight 60 and 45 respectively are enclosed in a vessel. The weight of A is 0.5 g and that of B is 0.2 g. The total pressure of the mixture is 750 mm. Calculate the partial pressure (in mm) of gas A.

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26. There are two closed containers A and B Container A contains PCl_3 gas at $25^\circ C$ temperature and 1 bar pressure. Container B

contain equilibrium mixture of gases obtained by partial decomposition of PCl_5 (g) at the same temperature and pressure. Assuming that initially equal mole of PCl_5 (g) at same temperature and pressure . Assuming that initially equal moles of PCl_5 were taken into the containers (before decomposition), the gases are allowed to effuse through a pinhole in the containers, Which container will show higher rate of effusion ? Justify .

A. container A

B. container B

C. both

D. none

Answer: B

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27. A vessel contains O_2 and H_2 in 2 : 1 molar ratio at 10 atm pressure then calculate ration of their rate of diffusion .

A. 1:2

B. 2:1

C. 66:9

D. 55:9

Answer: A

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28. Gases possess characteristic critical temperature which depends upon the magnitude of intermolecualr forces between the gas particles, critical temperatures of ammonia and carbon dioxide are 405.5 K and 304.10 K respectively. Which of these gases will liquefy first when you start cooling from 500 K to their critical temperature ?

A. NH_3

B. CO_2

C. both

D. none

Answer: NH_3

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29. Under what two conditions liquefaction of so called pemanent gases can be camed out ?

A. Critical temperature and critical pressure

B. Critical temperature and critical volume

C. Critical volume and critical pressure

D. None

Answer: A

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30. On what two factors surface tension depends ?

A. Mole fraction and temperature

B. Nature of liquid and surrounding environment

C. Volume and temperature

D. Temperature pressure

Answer: B

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31. Define surface energy of liquid -

A. It is defined as frictional force acting between two layer of liquid

B. It is defined as charge flow through conductor in given time

C. It is tendency of liquid surface at rest to shrink in to the minimum surface area possible

D. All of these

Answer: C

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32. Glass is an extremely. Viscous liquid comment .

A. Due to crystalline in nature

B. Due to amorphous in nature

C. Both

D. None

Answer: B

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33. Which one is more viscous water or oil ?

A. Oil

B. Water

C. Both

D. None

Answer: A

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34. Name the phenomenon responsible for the spherical shape of liquid drops.

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Assignment Section A

1. A sample of gas occupies 10 litre under a pressure of 1 atmosphere. What will be its volume if the

pressure is increased to 2 atmosphere? Assume that the temperature of the gas sample does not change

A. 2 L

B. 5 L

C. 10 L

D. 1 L

Answer:

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2. A gas at a pressure of 5.0 atm is heated from $0^\circ C$ to $546^\circ C$ and simultaneously compressed to one-third of its original volume. Hence, final pressure is:

A. 10 atm

B. 45 atm

C. 30 atm

D. 5 atm

Answer:

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

A. 0.05

B. 0.0526

C. 0.1

D. 0.0426

Answer:

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

A. Boyle's Law

B. Charles' Law

C. Avogadro Law

D. Graham's Law

Answer:

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5. To what temperature must a neon gas sample be heated to double its pressure, if the initial volume of gas at $75^{\circ} C$ is decreased by 15.0% by cooling the gas

A. 592 K

B. 492 K

C. 542 K

D. 642 K

Answer:

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6. When a gas filled in a closed vessel is heated through $1^{\circ}C$, its pressure is increased by 0.4 % . The initial temperature of the gas was

A. 250 K

B. 2500 K

C. 250° C

D. $25^{\circ}C$

Answer:

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7. One gram mole of a gas at NTP occupies 22.4 L. This fact is derived from

A. Dalton's theory

B. Avogadro's hypothesis

C. Berzelius hypothesis

D. Law of gaseous volume

Answer:

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

A. 4.32 litres

B. 5.02 litres

C. 4.22 litres

D. None of these

Answer:

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9. If density of a certain gas at $30^\circ C$ and 768 Torr is $1.35 kg/m^3$, then density at STP is

A. $1.48 kg/m^3$

B. $1.58 kg/m^3$

C. $1.25 kg/m^3$

D. $1.4 kg/m^3$

Answer:

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10. A vessel has 6g of hydrogen at pressure P and temperature 500K. A small hole is made in it so that hydrogen leaks out. How much hydrogen leaks out if the final pressure is P/2 and temperature falls to 300 K ?

A. 5 g

B. 4 g

C. 2 g

D. 3 g

Answer:

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11. What percent of a sample of nitrogen must be allowed to escape if its temperature, pressure, and volume are to be changed from $220^{\circ}C$, $3atm$, and $1.65L$ to $110^{\circ}C$, $0.7atm$, and $1L$, respectively?

A. 81 .8 %

B. 71 .8%

C. 76 .8 %

D. 86 .8 %

Answer:

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12. When $2g$ of a gas A is introduced into an evacuated flask kept at $25^\circ C$, the pressure is found to be $1atm$. If $3g$ of another gas B is then heated in the same flask, the total pressure becomes $1.5atm$. Assuming ideal gas behaviour, calculate the ratio of the molecular weights M_A and M_B.

A. $\frac{3}{1}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{2}{3}$

Answer:

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13. Which of the following mixtures of gases does not obey Dalton's law of partial pressure?

A. NO_2 and O_2

B. NH_3 and HCl

C. CO and CO_2

D. SO_2 and SO_3

Answer:

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

A. $1/6th$ of total pressure

B. $1/9th$ of total pressure

C. $2/3rd$ of total pressure

D. $1/8th$ of total pressure

Answer:

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15. A valve between a 5 litre tank in which the gas pressure is 9 atm and a 10 litre tank containing gas at 6 atm is opened and pressure equilibration ensures at a constant temperature. What is the final pressure (in atm) in the two tanks ?

A. 15 atm

B. 7 atm

C. 12 atm

D. 21 atm

Answer:

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16. Two non- reactive gases A and B are present in a container with partial pressures 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

A. 0.75

B. 0.5

C. 0.25

D. Cannot be calculated

Answer:

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17. The density of neon will be highest at

A. STP

B. $0^\circ C$ and 1 atm

C. $273^\circ C$ and 1 atm

D. $273^\circ C$ and 2 atm

Answer:

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

A. $\frac{V}{n} = \frac{P}{R}T$

B. $M\frac{V}{m} = \frac{P}{R}T$

C. $\frac{d}{M} = \frac{P}{R}T$

D. All of these

Answer:

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19. A bottle of dry ammonia and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends. The white ammonium chloride ring first formed will be

A. At the centre of the tube

B. Near the hydrogen chloride bottle

C. Near the ammonia bottle

D. Throughout the lenght of the tube

Answer:

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

A. $9:10$

B. $10:9$

C. $100:18$

D. $81:100$

Answer:

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21. 100 mL O_2 gas diffuses in 10 sec. 100 mL of gas X diffuses in t sec. Gas X and time t can be

A. $H_2 2.5s$

B. $SO_2 . 16S$

C. $CO, 10s$

D. $He, 4s$

Answer:

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22. Pressure exerted by a perfect gas equal to

A. Mean kinetic energy per unit volume

B. Half of the mean kinetic energy per unit volume

C. Two thirds of mean kinetic energy per unit volume

D. One third of mean kinetic energy per unit volume

Answer:

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23. When there can be more deviation in the behaviour of a gas from the ideal gas equation PV = nRT

A. At hight temperature and low pressure

B. At low temperature and high pressure

C. At high temperature and high pressure

D. At low tmeperature and lwo pressure

Answer: B

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24. In van der Waals equation of state for a non-ideal gas , the term that accounts for intermolecular forces is

A. $V - 1$

B. RT

C. $\left[P + \frac{a}{V^2}\right]$

D. $(RT)^{-1}$

Answer:

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25. Van der Waal's constant 'a' has the fimensions of

A. $MolL^{-1}$

B. $AtmL^2mol^{2-}$

C. Lite Mol^{-1}

D. $AtmLmol^{-2}$

Answer:

Watch Video Solution

26. van der Waal found that tow assumptions made by kinetic thory of gases were wrong. One of them

is that gas molecules are

A. Very large

B. Compressible

C. Point particles wihtout significant volume

D. Spherical

Answer: C

Watch Video Solution

27. Which one is correct realtion for 1 mole of real gases ?

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

B. $P=R\frac{T}{V-B}-\frac{a}{V^2}$

C. $\left(P+\frac{a}{V^2}\right)=\frac{(R+T)}{(V-b)}$

D. Both (1) & (2)

Answer:

Watch Video Solution

28. For a real gas, Z shows -

A. $Z<1$, gas is less compressible

B. $Z>1,$ gas is more compressible

C. $Z = \infty$, for an ideal gas

D. $PV \neq nRT$, for real gas

Answer: D

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29. The compressibility factor Z for the gas is given by -

A. $Z = PV_{obs}$

B. $Z = \frac{PV_{obs}}{nRT}$

C. $Z = nRT$

D. $Z = PV.nRT$

Answer: B

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30. Which of the following gas always shows positive deviation from ideal gas behaviour ?

A. H_2

B. CO_2

C. NH_3

D. CH_4

Answer: A

Watch Video Solution

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

A. $PV = nRT - \frac{n^2 a}{V}$

B. $PV = nRT + nbP$

C. $P = \frac{nRT}{V - b}$

D. $PV = nRT$

Answer:

Watch Video Solution

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

A. $1:1$

B. $349:2$

C. $2:349$

D. None of these

Answer:

Watch Video Solution

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

A. 4 times

B. 2 times

C. Same

D. $\frac{1}{2}$ times

Answer:

Watch Video Solution

34. The total kinetic energy in joules of the molecules in 8 g of methane at $27^{\circ} C$ is

A. 3741.30 J

B. 935.3 J

C. 1870.65 J

D. 700 J

Answer:

Watch Video Solution

35. At what temperature the RMS velocity of oxygen will be same as that of methane at $27^\circ C$?

A. $54^\circ C$

B. $327K$

C. $600K$

D. $573K$

Answer:

Watch Video Solution

36. The temperature at which the root mean square velocity of SO_2 molecules is same as that of O_2 molecules at $27^\circ C$

A. $600^\circ C$

B. $300^\circ C$

C. $327^\circ C$

D. $27^\circ C$

Answer:

Watch Video Solution

37. The average velocity of an ideal gas molecule at $27^\circ C$ is $0.3ms^{-1}$. The average velocity at $927^\circ C$ will be

A. 0.6 m/s

B. 0.3 m/s

C. 0.9 m/s

D. 3.0 m/s

Answer:

Watch Video Solution

38. At what temperature will the total KE of $0.3mol$ of He be the same as the total KE of $0.40mol$ of Ar at $400K$

A. 533 K

B. 400 K

C. 346 K

D. 300 K

Answer:

Watch Video Solution

39. 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

A. 32

B. 11.33

C. 4

D. 8

Answer:

Watch Video Solution

40. The rms velocity of hydrogen is $\sqrt{7}$ times the rms velocity of nitrogen. If T is the temperature of the gas, then

A. $T_{H_2} = T_{N_2}$

B. $T_{H_2} > T_{N_2}$

C. $T_{H_2} < T_{N_2}$

D. $T_{H_2} = \sqrt{7} T_{N_2}$

Answer:

Watch Video Solution

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

A. $\frac{400R}{41}$

B. $\frac{150R}{41}$

C. $\frac{41R}{400}$

D. $\frac{300R}{41}$

Answer:

Watch Video Solution

42. Write expressions for Boyle temperature and inversion temperature of a gas in terms of van der Waals constants. How are the two related to each other ?

A. $T_i = T_u$

B. $2T = T_b$

C. $T_i = 2T_b$

D. $T_i = \sqrt{T_b}$

Answer:

Watch Video Solution

43. The value of critical temperature in terms of van der Waals' constants a and b is given by

A. $T_c = 3b$

B. $T_c = \frac{a}{27b^2}$

C. $T_c = \frac{8a}{27bR}$

D. $T_c = \frac{27bR}{8a}$

Answer:

Watch Video Solution

44. Boyle's temperature T_b is equal to

A. $\frac{a}{b}$

B. $\frac{a}{bR}$

C. $\frac{2a}{bR}$

D. $\frac{a}{2bR}$

Answer: C

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

A. Critical point

B. Isoelectric point

C. Isotonic point

D. Ideal point

Answer: A

Watch Video Solution

46. Which of the following is correct regarding viscosity?

A. It is internal resistance of a liquid to flow

B. It increases with increase in temperature of the liquid

C. Coefficient of viscosity is not represented by η

D. All of these

Answer:

Watch Video Solution

47. If saturated vapours are compressed slowly (temperature remaining constant) to half the initital volume, the vapour pressure will

A. Becomes double

B. Becomes 4 times

C. Becomes half

D. Remains unchanged

Answer:

Watch Video Solution

Assignment Section B

1. A spherical balloon of 21 cm diameter is to be filled up with hydrogen at 1 atm, 273 K from a

cylinder containing the gas at 20 atm and $27^{\circ}C$. If the cylinder can hold 2.82 litre of water, calculate the number of balloons that can be filled up completely.

A. 11

B. 10

C. 8

D. 1

Answer:

Watch Video Solution

2. What is the correct increasing order of liquefiablility of the gas ?

A. $H_2 < N_2 < CH_4 < CO_2$

B. $H_2 < CO_2 < CH_4 < N_2$

C. $CO_2 < CH_4 < N_2 < H_2$

D. $CO_2 < CH_4 < H_2 < N_2$

Answer:

Watch Video Solution

3. At a temperature T K, the pressure of 4.0g argon in a bulb is p. The bulb is put in a bath having temperature higher by 50K than the first one 0.8g of argon gas had to be removed to maintained original pressure. The temperature T is equal to

A. 510 K

B. 200 K

C. 100 K

D. 73 K

Answer:

Watch Video Solution

4. An open flask containing air is heated from $300K$ to $500K$. What percentage of air will be escaped to the atmosphere, if the pressure is kept constant ?

A. 20

B. 40

C. 60

D. 80

Answer:

Watch Video Solution

5. Equal mass of H_2, He and CH_4 are mixed in empty container at 300 K, when total pressure is 2.6 atm The partial pressure of H_2 in the mixture is

A. 0.5 atm

B. 1.6 atm

C. 0.8 atm

D. 0.2 atm

Answer:

Watch Video Solution

6. At STP 16 mL of O_2 diffused through a porous partition in t seconds. What volume of CO_2 will diffuse in the same time and under the same conditions?

A. 13.65 mL

B. 10.5 mL

C. 20.2 mL

D. 224.8 mL

Answer:

Watch Video Solution

7. The molecular velocities of two gases at same temperature are u_1 and u_2, their masses are m_1 and m_2 respectively, which of the following expression is correct ?

A. $\frac{m_1}{u_1^2} = \frac{m_2}{u^2}$

B. $m_1 u_1 = m_2 u_2$

C. $\frac{m_1}{u_1} = \frac{m_2}{u_2}$

D. $m_1 u_1^2 = m_2 u_2^2$

Answer:

Watch Video Solution

8. Correct statement -

A. At constatn temperature, the KE of all the gas molecules is the same

B. At constant temperature, averge KE of gas molecules remains constant but KE of individual molecule may differ

C. At constant temperature , the KE is less for heavier gas molecules

D. At constatn temperature , the KE is less for heavier gas molecules

Answer: A

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9. Air contains 23 % oxygen and 77 % nitrogen by weight. The percentage of O_2 by volume is

A. 28.1

B. 20.7

C. 21.8

D. 23

Answer: B

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10. The density of a gas A is twice that of a gas B at the same temperature. The molecular mass of gas B is thrice that of A. The ratio of the pressure acting on A and B will be

A. $6:1$

B. $7:8$

C. $2:5$

D. $1:4$

Answer:

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11. The compressibility of a gas is less than unity at STP.

A. $V > 22.4L$

B. $V < 22.4L$

C. $V = 22.4L$

D. $V = 44.8L$

Answer:

Watch Video Solution

12. When the temperature of certain sample of a gas is chaged from $30^\circ C$ to 606 K and its pressure is reduced of gas changes from V to V^2 . The value of V is

A. $2dm^3$

B. $4dm^3$

C. $8dm^3$

D. Unprdictable

Answer: $2dm^3$

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13. Molar mass of certain gas A is half that of B. If rms speed of molecules of A at certain temperature is $200ms^{-1}$. The rms speed of B at the temperature half that of A will be

A. $200ms^{-1}$

B. $100ms^{-1}$

C. $300ms^{-1}$

D. $400ms^{-1}$

Answer:

Watch Video Solution

14. In what ratio by mass, the gases CO and 2 butene (C_4H_8) be mixed in a vessel so that they cause same partial pressures ?

A. $1:1$

B. $2:1$

C. $1:2$

D. $1:3$

Answer: C

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15. A sample of gas contains N_1 molecules and the total kinetic energy at $-123^\circ CisE_1$ ergs. Another sample of gas at $27^\circ C$ has total kinetic energy as $2E_1$ ergs. Assuming gases to be ideal, the number of gas molecules in the second sample will be

A. N_1

B. $N_1/2$

C. $2N_1$

D. $4N_1$

Answer: N_1

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16. A gas in a vessel is heated in such a way that its pressure and volume both becomes two times. The temperature of the gas expressed in Kelvin scale becomes

A. Half

B. Becomes two times

C. Becomes $2/3^{rd}$ of its original value

D. Becomes four times

Answer:

Watch Video Solution

17. At constant volume, for a fixed number of moles of a gas, the pressure of the gas increases with the rise in temperature due to

A. Increases in avergage molecular speed

B. Increase in rate of collisions amongst

C. Increase in molecualr attraction

D. Increase in mean free path

Answer:

Watch Video Solution

18. The root mean square velocity of an ideal gas to constant pressure varies with density (d) as

A. d^2

B. d

C. $\sqrt{d}$

D. $\frac{1}{\sqrt{d}}$

Answer:

Watch Video Solution

19. Which of the following has maximum number of molecules?

A. $2.7 \text{ g of } NH_3$

B. $1LSO_2 \text{ at STP}$

C. $2L \text{ of } Cl_2 \text{ at STP}$

D. $0.1molofH_2S$

Answer:

Watch Video Solution

20. Three different gases X, Y and Z of molecular masses 2, 16 and 64 were enclosed in a vessel at constant temperature till equilbrium is reaches. Which of the following statement is correct?

A. Gas X will be more at bottom

B. Gas Y will be more at top

C. Gas X, Y, Z are homogeneously present

D. Gas Y will be more at bottom

Answer:

Watch Video Solution

21. Density of gaseous mixture Aand B from percentage volume is given as

A. $d_{mix} = \frac{d_A}{\%\ A} + \frac{d_B}{(\%\ B)}$

B. $d_{mix} = d_A \times (\%\ A) + d_B \times (\%\ B)$

C. $d_{mix} = \frac{d_A \times (\%\ A) + d_B \times (\%\ B)}{100}$

D. $d_{mix} = \frac{d_A + d_B}{100}$

Answer:

Watch Video Solution

22. The Critical temperature , Boyle's temperature and inversion temperature respectively are given as

A. $\frac{1}{Rb}, \frac{8a}{27Rb}, \frac{2a}{Rb}$

B. $\frac{8a}{27Rb}, \frac{a}{Rb}, \frac{2a}{Rb}$

C. $\frac{8a}{Rb}, \frac{a}{Rb}, \frac{2a}{Rb}$

D. $\frac{a}{Rb}, \frac{a}{27Rb}, \frac{2a}{Rb}$

Answer: B

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23. Which of the following is incorrect for pressure units?

A. 1 atmosphere is equal to 1.01325 bar

B. 1.01325 bar is equal to 0.875 atmosphere

C. 1.01325×10^5 Pa is equal to 1.01325 bar

D. 1 atmosphere is equal to $1.01325 \times 10^5 kgm^{-1}s^{-2}$

Answer:

Watch Video Solution

24. If the pressure of a given mass of gas is reduced to half and temperature is doubled simultaneously the volume will be

A. $\frac{V}{4}$

B. $2V^2$

C. $6V$

D. 4V

Answer:

Watch Video Solution

25. The temperature at which a real gas obeys the ideal gas laws over a wide range of pressure is called

A. Boyle's temperature

B. Inversion temperature

C. Critical temperature

D. Kraft temperature

Answer:

Watch Video Solution

26. Which of the following is not correct in case of kinetic theory of gases?

A. Gases are made up of small particles of negligible size as compared to container size

B. The molecules are in random motion always

C. When molecules Collide they lose energy

D. When the gas is heated, the average kinetic energy of gas molecules increase

Answer: C

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27. van der Waal's constant 'a' and 'b' are related with _____ respectively

A. Attractive force and bond energy of molecules

B. Attractive force and volume of molecules

C. Volume and repulsive force of molecules

D. Shape and repulsive force of molecules

Answer: B

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28. The rate of diffusion of a gas having molecular weight. just double of hydrogengas is 30 mls-1. The rate of diffusion of hydrogen gas will be

A. $42.42mls^{-1}$

B. $60mls^{-1}$

C. $120mls^{-1}$

D. $21.21mls^{-1}$

Answer:

Watch Video Solution

29. At high temperature and low pressure van der Waal's equation becomes

A. $\left(p+\frac{a}{V^2}\right)(V-b)=RT$

B. $\left(P+\frac{a}{V^2}\right)V=RT$

C. $P(V-b)=RT$

D. $PV=RT$

Answer:

Watch Video Solution

30. At constant volume , pressure and temperature are related $(T_0 = \quad \text{STP temp.})$

A. $P_1 = P_0\left(1 + \frac{t}{273}\right)(t = {}^\circ C)$

B. $P_1 = P_0\frac{T_0}{T}(T = \text{in K})$

C. $P_0 = P_1\left(\frac{273 + t}{273}\right)$

D. All of these

Answer: A

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31. Ratio of C_p and C_v of a gas X is 1.4, the number of atom of the gas 'X' present in 11.2 litres of it at NTP will be

A. 6.02×10^{23}

B. 1.2×10^{23}

C. 3.01×10^{23}

D. 12.04×10^{23}

Answer:

Watch Video Solution

32. The slope of the graph between log P and log V at constant temperature for a given mass of gas is

A. $+1$

B. -1

C. $\frac{1}{T}$

D. $\frac{1}{n}$

Answer: B

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Assignment Section C

1. 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 ?

A. $\frac{1}{2}$

B. $\frac{1}{8}$

C. $\frac{1}{4}$

D. $\frac{3}{8}$

Answer:

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2. A gas such as carbon monoxide would be most likely to obey the ideal gas law at

A. High temperatures and high pressures

B. Low temperatures and low pressures

C. Hihg temperatures and low pressures

D. Low temperatures and high pressures

Answer:

Watch Video Solution

3. Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature $27^\circ C$ in identical conditions. The ratio of the volume of gases $H_2 : O_2$: methane would be

A. $8 : 16 : 1$

B. $16 : 8 : 1$

C. $16 : 1 : 2$

D. $8 : 1 : 2$

Answer:

Watch Video Solution

4. Dipole-induced dipole interaction are present in which of the following pairs

A. Cl_2 and CCl_4

B. HCl and He atoms

C. SiF_4 and He atoms

D. H_2O and alcohol

Answer:

Watch Video Solution

5. Maximum deviation from ideal gas is expected from

A. $N_2(g)$

B. $CH_4(g)$

C. $NH_3(g)$

D. $H_2(g)$

Answer:

Watch Video Solution

6. A certain gas takes three times as long to effuse out as helium. Its molar mass will be

A. 27 u

B. 36 u

C. 64 u

D. 9 u

Answer:

Watch Video Solution

7. 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 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:

A.

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

B.

$$(I)O_2 < He < H_2CO_2(II)H_2 > O_2 > CH_4$$

C.

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

D.

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

Answer:

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8. By what factor does the average velocity of a gaseous molecule increase when the temperature (in Kelvin) is doubled?

A. 1.4

B. 2.0

C. 2.8

D. 4.0

Answer:

Watch Video Solution

9. 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 atomosphere, the partical pressure of the nitrogen (N_2) in the mixture is

A. $1atm$

B. $0.5atm$

C. $0.8atm$

D. $0.98atm$

Answer:

Watch Video Solution

10. Two gases A and B having the same volume diffuse through a porous partition in 20 and 10 seconds respectively. The molar mass of A is $49u$. Molar mass of B will be

A. $25.00u$

B. $50.00u$

C. $12.25u$

D. $6.50u$.

Answer:

Watch Video Solution

11. A bubble of air is underwater at temperature $15^{\circ}C$ and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is $25^{\circ}C$ and the pressure is 1.0 bar, what will happen to the volume of the bubble?

A. Volume will become smaller by a factor of 0.70

B. Volume will become greater by a factor of 2.5

C. Volume will become greater by a factor of 1.6

D. Volume will become greater by a factor of 1.1

Answer:

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12. The pressure exerted by $6.0g$ of methane gas in a $0.03m^3$ vessel at $129^\circ C$ is: (Atomic masses of $C = 12.01, H = 1.01$ and $R = 8.314JK^{-1}mol^{-1}$)

A. 215216 Pa

B. 13409 Pa

C. 41648 Pa

D. 31684 Pa

Answer:

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13. A monoatomic gas at pressure P_1 and volume V_1 is compressed adiabatically to $\frac{1}{8}th$ of its original volume. What is the final pressure of gas.

A. $64P_1$

B. P_1

C. $16P_1$

D. $32P_1$

Answer:

Watch Video Solution

14. If a gas expands at constant temperature, it indicates that

A. Number of the molecules of gas increases

B. Kinetic energy of the molecules decreases

C. Pressure of the gas increases

D. Kinetic energy of molecules reamins the same

Answer:

Watch Video Solution

15. The surface tension of which of the following liquid is maximum?

A. H_2O

B. C_6H_6

C. CH_3OH

D. C_2H_5OH

Answer:

Watch Video Solution

16. What is the density of N_2 gas at $227^\circ C$ and $5.00 atm$ pressure? $\left(R = 0.0821 atm K^{-1} mol^{-1}\right)$

A. 0.29 g/ml

B. 1.40 g/ml

C. 2.81 g/ml

D. 3.41 g/ml

Answer:

Watch Video Solution

17. Equal weight of CH_4 and H_2 are mixed in an empty container at $25^\circ C$. The fraction of the total pressure exerted by H_2 is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{9}$

D. $\frac{8}{9}$

Answer:

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18. 50 mL of hydrogen diffuse through a small hole from a vessel in 20 mintues time. Time taken for 40 ml of oxygen to diffuse out under similar conditions will be :

A. 32 minutes

B. 64 minutes

C. 8 minutes

D. 12 minutes

Answer:

Watch Video Solution

19. The temperature of the gas is raised from $27^\circ C$ to $927^\circ C$, the root mean square velocity is

A. Remians same

B. Gets $\sqrt{\frac{927}{27}}$ times

C. Gets halved

D. Gets doubled

Answer:

Watch Video Solution

20. An ideal gas , obeying kinetic theory of gases cannot be liquefied, because :-

A. It solidifies before becoming a liquid

B. Forces acting between its molecules are negligible

C. Its critical temperature is above $0^{\circ} C$

D. Its molecules are relatively small in size

Answer:

Watch Video Solution

21. Which of the following mixture of gases does not obey alton's Law of partial pressure?

A. Cl_2 and SO_2

B. CO_2 and He

C. O_2 and CO_2

D. N_2 and O_2

Answer:

Watch Video Solution

22. If 0.24 g of a volatile liquid upon vaporization gives 45 ml of vapours at NTP.What will be the vapour density of the substance ? (Density of $H_2 = 0.089 g L^{-1}$)

A. 95.93

B. 59.73

C. 95.39

D. 5.993

Answer:

Watch Video Solution

23. The average kinetic energy of an ideal gas per molecule in SI units at $25^\circ C$ will be

A. $6.17 \times 10^{29} J$

B. $7.16 \times 10^{-29} J$

C. $61.7 \times 10^{-21} J$

D. $6.17 \times 10^{-21} J$

Answer:

Watch Video Solution

24. At $25^{\circ}C$ and 730 mm pressure, 380 mL of dry oxygen was collected. If the temperature is constant, what volume will be oxygen occupy at $760mm$ pressure ?

A. 569 ml

B. 365 ml

C. 265 ml

D. 621 ml

Answer:

Watch Video Solution

25. Which of the following statements is wrong for gases?

A. Confined gas exerts uniform pressure on the "Walls of its container in all directions

B. Volume of the gas is equal to volume of container confining the gas

C. Gases do not have a definite shape and volume

D. Mass of a gas cannot be determined by weighing a container in which it is enclosed

Answer:

Watch Video Solution

26. Average K.E. of CO_2 at $27^\circ C$ is E. the average kinetic energy of N_2 at the same temperature will be

A. $KE_1 = KE_2$

B. $KE_1 > KE_2$

C. $KE_1 < KE_2$

D. Can't say any thing. Both volumes are not given

Answer:

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27. The Beans are cooked earlier in pressure cooker, because : -

A. Boiling point increases with increasing pressure

B. Boiling point decreases with increasing pressure

C. Extra pressure of pressure cooker softens the beans

D. Internal energy is not lost while cooking in pressure cooker

Answer:

Watch Video Solution

28. Van der Waals real gas acts an ideal gas at which conditions?

A. High temperature, low pressure

B. Low temperature, high pressure

C. "High emperature, high pressure

D. Low temperature, low pressure

Answer:

Watch Video Solution

29. What is the dominant intermolecular forces or bond that must be overcome in converting liquid CH_3OH to gas ?

A. London dispersion force

B. Hydrogen bonding

C. Dipole-dipole interaction

D. Covalent bonds

Answer:

Watch Video Solution

Assignment Section D

1. A : The value of van der Waal's constant 'a' of Cl_2 is larger than that of F_2

R : Larger the surface area, higher will. Be intermolecualr forces of attraction .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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2. A : On increasing the temperature , the hight of the peak of the Maxwell curve decreases .

R : The total are under the curve reamins constant for fixed amount of gas.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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3. A: A real gas will approach ideal behaviour at high temperature and low pressure.

R: At low pressure and high temperature z = 1, for all gases

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the

assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer:

Watch Video Solution

4. A. Rate of diffusion of H_2 is 1.44 times of He.

R: Under similar conditions of temperature and pressure all gases diffuse with same velocity.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer:

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5. Assertion: At constant temperature, if pressure on the gas is doubled, density is also doubled.

Reason: At constant temperature, molecular mass of a gas is directly proportional to the density and inversely proportional to the pressure

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer:

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6. A: For a certain amount of gas, PV is always constant at constant temperature.

R: On increasing temperature PV increases for fixed amount of ideal gas.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: B

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7. Assertion : The pressure of real gas is less than the pressure of ideal gas. Reason : Intermolecular forces of attraction in real gases are greater than in ideal gas.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer:

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8. A: Helium shows only positive deviation from ideal behaviour.

R : Helitim is a noble gas

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: B

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9. A: Hot air balloon rises up by displacing the denser air of the atmosphere.

R: The given mass of a gas becomes less denser.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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10. A: H_2 when allowed to expand at room temperature it causes heating effect.

R: H_2 has inversion-tomperature much below room temperature.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the

assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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11. A: At very high pressures, compressibility factor is greater than 1.

R: At very high pressure, 'b' can be neglected in van der Waals gas equation

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: C

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12. A : Greater is the ciritical temperature, more difficult is to liquefy the gas.

R : Stronger are the intermolecualar forces lower would be the ciritcal temperature of that gas.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: D

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13. A: For a real gas if molar volume is less than 22.4 V litres, at S.T.P., compressibility factor (Z) is less than unity.

R : Z=PV /RT, if $PV < RT$ then $Z < 1$

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the

assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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14. A :Vapour pressure of the liquid increases with increase in temperature.

R : At elevated temperture increases .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: C

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15. A : At constant temperature, thegas density is directly proportional to pressure.

R : More is the pressure of the gas , the denser it becomes.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the

assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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