CHEMISTRY

BOOKS - MARVEL CHEMISTRY (HINGLISH)

STATES OF MATTER : GASES AND LIQUIDS

Multiple Choice Questions Standard Level

1. Kinetic energy of molecules is highest in

    A. Gases

    B. Solids

    C. Liquids

    D. Solutions

Answer: A

2. Which is distilled first ?

A. Liquid H_2

B. Liquid CO_2

C. Liquid O_2

D. Liquid N_2

Answer: A

3. At ordinary temperature and pressure, chlorine is because a gas, bromine is a liquid and iodine is a solid because

A. the specific heat is in the order $l_2 > Br_2 > Cl_2$

B. intermolecular forces among molecules of chlorine are weakest and those of iodine the strongest

C. the order of density $I_2 > Br_2 > Cl_2$

D. the order of stability si $I_2 > Br_2 > Cl_2$

Answer: B

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4. Which one of the following is the correct order of interactions ?

A. Covalent < hydrogen bonding < van der Waals < dipole-dipole

B. van der Waals < hydrogen bonding < dipole-dipole < covalent

C. van der Waals < dipole -dipole < hydrogen bonding < covalent

D. Dipole-dipole $<$ van der Waals $<$ hydrogen bonding $<$ covalent

Answer: B

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5. In which of the following set of molecules is the order of boiling point incorrect?

A. Xe $>$ Ar $>$ He

B. HF $>$ HCl $>$ HBr

C. $H_2 > H_2Se > H_2S$

D. $C_3H_8 > C_2H_6 > CH_4$

Answer: B

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

A. Dipole -dipole interaction

B. Covalent bonds

C. London dispersion forces

D. hydrogen bonding

Answer: D

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7. Which of the following has the lowest boiling point ?

A. Liquid H_2

B. Liquid CO_2

C. Liquid O_2

D. Liquid N_2

Answer: A

8. At ordinary temperature and pressure, chlorine is because a gas, bromine is a liquid and iodine is a solid because

A. the specific heat is in the order $l_2 > Br_2 > Cl_2$

B. intermolecular forces among molecules of chlorine are weakest and those of iodine the strongest

C. the order of density $l_2 > Br_2 > Cl_2$

D. the order of stability si $l_2 > Br_2 > Cl_2$

Answer: B

9. Which factor is most responsible for the increase in boiling points of noble gases from He to Xe?

    A. Decrease in I.E.

    B. Monoatomic noture

    C. Decrease in polarisability

    D. Increase in polarisability

Answer: D

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10. Type of forces between molecules of C_6H_6 are

    A. Dipole -dipole interaction

    B. Dispersion forces

    C. H-bonding

D. Dipole induced -dipole forces

Answer: B

11. Which of the following exhibits the weakest intermolecular forces?

A. NH_3

B. HCI

C. He

D. H_2O

Answer: C

12. In group 16 which hydride has higest boiling point ?

A. H_2O

B. H_2S

C. H_2Se

D. H_2Te

Answer: A

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Gaseous State

1. Dimensions of pressure are same as that of

A. Energy

B. Force

C. Energy per unit volume

D. Force per unit volume

Answer: C

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2. Poise stands for

    A. 1 dyne cm $\sec^{-2}$

    B. 1 dyne sec cm^{-2}

    C. 10^{18} e.s.u. cm

    D. 10^{-7} erg sec

Answer: B

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3. Which of the following statements is not correct about the three states of matter, i.e., solid, liquids and gas?

A. Molecules of a solid possess least kinetic energy whereas those of a gases possess highest kinetic energy

B. The desity of solid is highest whereas that of gases is lowest

C. Gases like liquids possess definite volumes

D. Molecules of a solid possess vibratory motion

Answer: C

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4. Which of the following is true about gaseous state?

A. Thermal energy = Molecular attraction

B. Thermal energy $>$ $>$ Molecular attraction

C. Thermal energy $<$ $<$ Molecular attraction

D. Molecular forces $>$ $>$ Those in liquids

Answer: B

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5. 1° C rise in temperature is equal to a rise of

    A. 1° F

    B. $9/5^\circ$ F

    C. $5/9^\circ$ F

    D. 33° F

Answer: B

---

6. At what temperature will both the Celsius and Fahrenheit scales read the same value?

A. $0°C$

B. $32°F$

C. $-40°C$

D. $40°C$

Answer: C

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Boyle S Law Charles Law Gay Lussacs Law And Avogadros Law

1. When gases are heated from $20°$ to $40°$ C at constant pressure their volumes

A. increase by the same megnitude

B. become double

C. increase in the ratio of their molecular masses

D. increase but to different extent

Answer: D

2. Aqueous tension of water depends on

    A. the amount of the water taken

    B. the temperature only

    C. both on the amount of water and temperature

    D. neither the temperature nor the amount of water but on certain

       other factors

Answer: B

3. The ratio of the partical pressure of a gaseosy component to the total vapour pressure of the mixtuer is equal to :
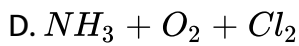
    A. mass of the component

    B. mole fraction of the component

    C. mass % of the component

    D. molecular mass of the component

Answer: B

4. Dalton's law of partial pressures will not hold good for which of the following ?

    A. $H_2 + O_2 + CO_2$

    B. $N_2 + HBr + Cl_2$

    C. $Cl_2 + NH_3 + HBr$

D. $NH_3 + O_2 + Cl_2$

Answer: C

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

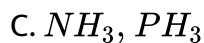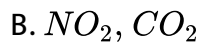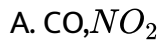A. $\dfrac{p}{\sqrt{d}}$

B. $\dfrac{p}{d}$

C. $\sqrt{\dfrac{p}{d}}$

D. $\dfrac{\sqrt{p}}{d}$

Answer: A

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6. Which of the following pairs will effuse at the same rate through a porous plug .

    A. CO, NO_2

    B. NO_2, CO_2

    C. NH_3, PH_3

    D. NO, C_2H_6

Answer: D

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7. Which of the following gas will have highest rate of diffusion ?

    A. NH_3

    B. N_2

    C. CO_2

D. O_2

Answer: A

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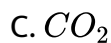
8. Which of the following statement is false ?

A. The product of pressure and volume of fixed amount of a gas is

independent of temperature

B. Molecules of different gases have the same K.E. at a given

temperature

C. The gas equation is not valid at high pressure and low

temperature

D. The gas constant per molecule is known as Boltzmann constant

Answer: A

9. Air at sea level is dense. This is a practical application of

A. Boyle's law

B. Charle's law

C. Avogadro's law

D. Dalton's law

Answer: A

10. The slope of the plot between pV and p at constant temperature is

A. zero

B. 1

C. $1/2$

D. $1/\sqrt{2}$

11. Hydrogen diffuses six times faster than gas A. The molar mass of gas A is

A. 72

B. 6

C. 24

D. 36

12. The ratio of the rate of diffusion of helium and methane under indentical conditions of pressure and temperature will be

A. 4

B. 2

C. 1

D. 0.5

Answer: B

13. Steam distillation is based on

A. Boyle's law

B. Charle's law

C. Dalton's law of partial pressures

D. Avogadro's law

Answer: C

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14. Graph between p and V at constant temperature is

A. straight

B. curved increasing

C. straight line with slope

D. parabolic curve decreasing

Answer: D

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15. In order to increase the volume of a gas by 10% , the pressure of the gas should be

    A. decrease by 10%

    B. decreased by 1%

    C. increased by 10%

    D. decreased by 1%

Answer: A

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16. Which one of the following plot will be a hyperbola at constant temperature ?

    A. P vs 1/V

    B. PV vs P

C. V vs P

D. V vs PV

Answer: C

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17. The mountaineers carry oxygen gas cylinders with them while climbing high mountains . Give reasons.

A. Density of air is high at the altitudes

B. Density of air is low at the altitudes

C. Air is less pure at the altitudes

D. Air contains no oxygen at the altitudes

Answer: B

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18. If V_0 is the volume of a given mass of gas at $273K$ at a constant pressure then according to Charles' law, the volume at $10°C$ will be _____.

A. $10V_0$

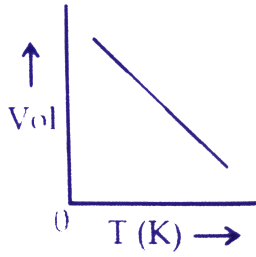B. $\dfrac{1}{273}(v_0 + 10)$

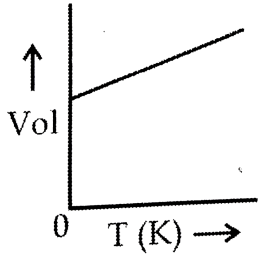C. $V_0 + \dfrac{10}{273}$

D. $\dfrac{283}{273}V_0$

Answer: D

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19. The correct representation of Charle's law is given in

A.

B.

C.

D.
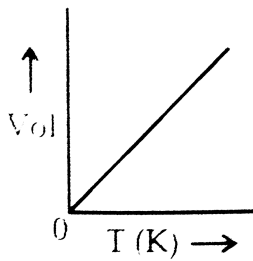
Answer: B

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20. At of the following does not showexpliently the relationship between Boyle's law and Charles'law?

A. $\dfrac{P_1}{P_2} = \dfrac{T_1}{T_2}$

B. PV=K

C. $\dfrac{P_1}{P_2} = \dfrac{V_1}{V_2}$

D. $\dfrac{V_2}{V_1} \times \dfrac{P_1}{P_2} = \dfrac{T_2}{T_1}$

Answer: D

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21. If the absolute temperature of a gas is doubled and the pressure is reuced to one-half, the volume of the gas will _____

A. Remain unchanged

B. Be doubled

C. Increase four-fold

D. Be reduced to $1/4^{th}$

Answer: C

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22. The molar volume of CO_2 is maximum at

A. STP

B. $0°$ C and 2.0 atm

C. $127°$ C and 1 atm

D. $273°$ C and 2 atm

Answer: C

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23. There is 10 litre of a gas at STP Which of the following new conditions keep the volume constant?

   A. 273K and 2atm. Pressure

   B. $273°$ C and 2 atm . Pressure

   C. $546°$ C and 0.5 atm. Pressure

   D. $0°$ C and 0.0 atm. Pressure

Answer: B

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24. Five grams each of the following gases at $87°C$ and 750 mm pressure are taken. Which of them will have the least volume ?

   A. HF

   B. HCl

   C. HBr

D. HI

Answer: D

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25. According to Charles' law, at constant pressure, 100 ml of a given mass of a gas with $10°C$ rise in temperature will become ($\frac{1}{273}$ = 0.00366)

A. 100.0366

B. 99.9634

C. 103.66

D. 100.366

Answer: C

26. A sealed tube which can withstand a pressure of 3 atmosphere is filled with air at $27°C$ and 760 mm pressure. Find the temperature above which it will burst.

    A. $81°$C

    B. $627°$C

    C. $900°C$

    D. $1173°$ C

Answer: B

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27. $400cm^3$ of oxygen at $27°C$ were cooled to $-3°C$ without change in pressure. The contraction in volume will be as per Charle's law?

    A. $30cm^3$

B. $40 cm^3$

C. $44.4 cm^3$

D. $360 cm^3$

Answer: B

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28. An electron tube was sealed off during manufacture at a pressure of 1.2×10^{-7} mm of mercury at $27° C$. Its volume is $100 \ cm^3$. The number of molecules that remain in the tube is

A. 6.02×10^{14}

B. $8.2 \times 6.02 \times 10^{23}$

C. 24.6×10^6

D. $8.2 \times 30 \times 6.02 \times 10^{23}$

Answer: A

29. 16 g of oxygen and 3g of hydrogen are mixed and kept at $760mm$ of Hg pressure and $0°C$. The total volume occupied by the mixture will be nearly _____.

A. 22.4 L

B. 33.6 L

C. 448 L

D. 44800 mL

Answer: D

30. 2.8 g of N_2 0.40 g of H_2 and 6.4 g of O_2 are placed in a container of 1.0 L capacity at $27°$ C. The total pressure in the container is

A. 6.15 atm

B. 12.3 atm

C. 1.123 atm

D. 24.6 atm

Answer: B

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31. One litre of a gas weights 2 g at 300 K and 1 atm pressure. If the pressure is made 0.75 atm at which of the following temperature will one litre of the same gas weight one gram ?

A. 450 K

B. 600 K

C. 800 K

D. 900 K

Answer: A

32. The closed containers of the same capacity and at the same temperature are filled with 44 g of H_2 in one and 44 g of CO_2 in the other . If the pressure of carbon dioxide in the second container is 1 atm , then pressure of hydrogen in the first container would be :

A. 1 atm

B. 10 atm

C. 22 atm

D. 44 atm

Answer: C

33. V vs T curves at constant pressure P_1 and P_2 for an ideal gas are shown below
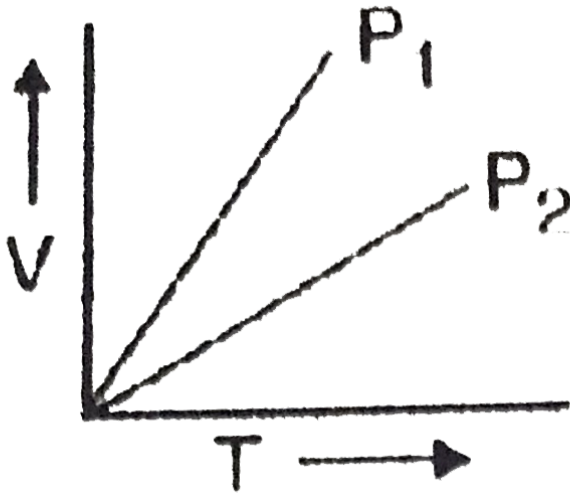
Which is correct ?

A. $P_1 > P_2$

B. $P_1 < P_2$

C. $P_1 = P_2$

D. All of the above

Answer: B

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34. Containers A,B and C of equal volume contain oxygen neon and methane respectively at the same temperature and pressure . The correct increasing order of their masses is [C=12, Ne =20 H=1]

A. $A < B < C$

B. $B < C < A$

C. $C < A < B$

D. $C < B < A$

Answer: D

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35. Pressure remaining the same, the volume of a given mass of an ideal gas increases for every degree centigrade rise in temperature by define fraction of its volume at

A. 0° C

B. Absolute zero

C. Its critical temperature

D. Its Boyle's temperature

Answer: A

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36. At constant temperature, in a given mass of an ideal gas -

A. The ratio of pressure and volume always remains constant

B. Volume always remains constant

C. pressure always remains constant

D. The product of pressure and volume always rmains constant

Answer: D

37. 500 mL of nitrogen at $27°C$ is cooled to $-5°C$ at the same pressure. The new volume becomes

    A. 326.32 mL

    B. 446.66 mL

    C. 546.32 mL

    D. 771.56 mL

Answer: B

38. 600 cc of a gas at a pressure of 750 mm is compressed to 500 cc. Taking the temperature to remain constant, the increase in pressure is

    A. 150 mm

B. 250 mm

C. 350 mm

D. 450 mm

39. 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. 365 mL

B. 465 mL

C. 565 mL

D. 665 mL

Answer: A

40. Which of the following volume-temperature $(V - I)$ plots represents the behaviour of 1mole of an ideal gas at the atmospheric pressure?

A.

V (l.)

(36.8 L, 373 K)

(22.4 L, 273 K)

T (K)

B.

V (l.)

(26.8 L 373 K)

(22.4 L 273 K)

T (K)

C.

V (L)

(30.6 L, 373 K)

(22.4 L, 273 K)

T (K)

D.

Answer: C

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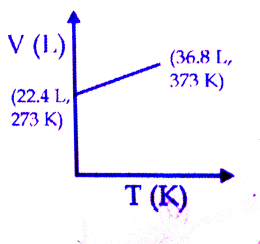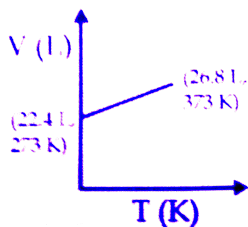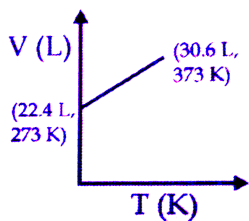
41. At $27^\circ C$, a ges is compressed to half of its volume . To what temperature it must now be heated so that gas occupies just its original volume ?

A. 54° C

B. 327° C

C. 600° C

D. 427° C

Answer: B

42. The temperature of a certain mass of a gas was increased from $29°$ C to $30°$ C at constant pressure the volume of the gas

    A. will remain the same

    B. will decrease by 1/273 of its volume at 273 K

    C. will increase by 1/273 of its volume at $29°$ C

    D. will increase by 1/273 of its volume at $30°$C

Answer: C

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43. If $P, V,$ and T represent pressure, volume and temperature of the gas, the correct representation of Boyle's law is

    A. $V \infty \dfrac{1}{T}$ (at constant P)

    B. PV=RT

C. $V \propto \dfrac{1}{P}$ (at constant T)

D. PV=nRT

Answer: C

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44. Air at sea level is dense. This is a practical application of

A. Boyle's law

B. Charle's law

C. Avogadro's law

D. Dalton's law

Answer: A

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45. If $20cm^3$ gas at $1atm$ is expanded to $50cm^3$ at constant T, then what is the final pressure

A. $20 \times \dfrac{1}{50}$

B. $1 \times \dfrac{1}{20} \times 50$

C. $1 \times 20 \times \dfrac{1}{50}$

D. None of these

Answer: A

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46. Which of the following graph represents Boyle's law ?

A.

B.

C.

D.
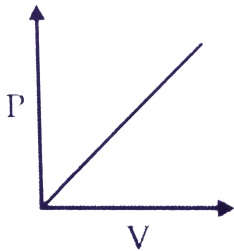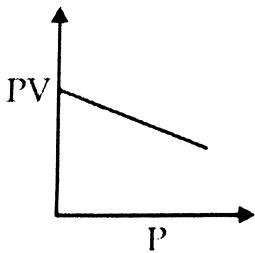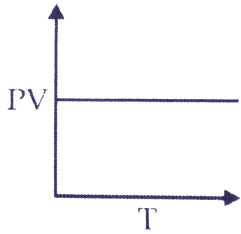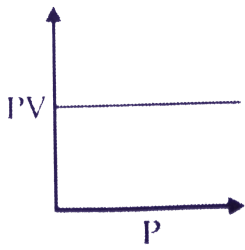
Answer: B

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47. At constant pressure , the volume of fixed mass of an ideal gas is

directly proportional to

A. Absolute temperature

B. Degree centigrade

C. Degree Fahrenheit

D. None of these

Answer: A

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48. Which of the following expression at constant pressure represents Charles's law?

A. $V \infty \dfrac{1}{T}$

B. $V \infty \dfrac{1}{T^2}$

C. $V \infty T$

D. $V \infty d$

Answer: C

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49. Use of hot air ballons in sports and meteorological observations in an application of

    A. Boyle's law

    B. Newtonic law

    C. Kelvin's law

    D. Charle's law

Answer: D

50. A certain sample of gas has a volume of 0.2 litre measured at $1atm$ pressure and $0°C$. At the same pressure but at $273°C$, its volume will be

    A. 0.4 litres

    B. 0.8 litres

    C. 27.8 litres

    D. 55.6 litres

Answer: A

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

    A. Dalton's theory

B. Avogardo's law

C. Berzelius hypothesis

D. Law of gaseous volume

Answer: B

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52. The density of a gas at $27°C$ and $1atm$ is d. Pressure remaining constant, at which of the following temperture will its density become $0.75d$?

A. $20°$ C

B. $30°C$

C. 400 K

D. 300 K

Answer: C

53. Equal volumes of gases at the same temperature and pressure contain equal number of particles. This statement is a direct consequence of

    A. Avogadro's law

    B. Charle's law

    C. Ideal gas equation

    D. Law of partial pressure

Answer: A

54. 4.4 g of a gas at STP occupies a volume of 2.24 L. The gas can be :

A. O_2

B. CO

C. NO_2

D. CO_2

Answer: D

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55. The density of O_2 is 16 at STP. At what temperature (in $.^\circ C$) its density will be 14 ? Consider that the pressure remais constant.

A. 50° C

B. $39^\circ C$

C. 57° C

D. $43^\circ C$

Answer: B

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56. 500mL of NH_3 contains 6.02×10^{23} molecules at STP. How many molecules are present in 100 mL of CO_2 at STP?

A. 6×10^{23}

B. 1.5×10^{23}

C. 1.2×10^{23}

D. None of these

Answer: C

57. If molecular mass of O_2 and SO_2 are 32 and 64 respectively. If one litre of O_2 at $15°C$ and 759mm pressure contains N molecules, the number of molecuels in two litre of SO_2 under the same conditions of temperature and pressure will be:

A. N/2

B. Newtonic law

C. 2 N

D. 4 N

Answer: C

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58. If pressure becomes double at the same absolute temperature on $2LCO_2$, then the volume of CO_2 becomes

A. 2 L

B. 4 L

C. 25 L

D. 1 L

Answer: D

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Ideal Behaviour And Gas Equation And Deviation From Ideal Behaviour

1. The gas constant R is a constant

A. only for real gases

B. only for ideal gases

C. both for real and ideal gases

D. nether for real nor for ideal gases

Answer: C

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2. Select one correct statement. In the gas equation, $PV = nRT$

    A. n is the number of molecules of a gas

    B. V denotes volume of one mole of the gas

    C. n moles of the gas have a volume of the gas

    D. P is the pressure of the gas when only one mole of gas is present

Answer: C

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3. Real gases show deviation from ideal behaviour at low temperature and high pressure.

A. temperature is low and pressure is high

B. temperature si high and Pressure is low

C. both temperature and pressure are low

D. both temperature and pressure are high

Answer: A

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4. The units of the van der Waals constant a are

A. atm $L^2 \text{moL}^2$

B. atm $L^{-2}\text{moL}^{-2}$

C. atm $L^2 \text{moL}^{-1}$

D. mol L^{-1}

Answer: A

5. The units of the van der Waal's constant 'b' are

    A. atmoshere

    B. joules

    C. L mol^{-1}

    D. mol L^{-1}

Answer: C

6. Inert gases such as heliume behave like ideal gases over a wide range of temperature .However , they condense into the solid state at very low temperatures. it indicates that at very low temperature there is a

    A. negative deviation

B. positive deviation

C. positive and negative deviation

D. none

Answer: A

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7. Any gas shows maximum deviation from ideal gas behaviour at

A. $0°$ C and 1 atmospheric pressure

B. $100°$ C and 2 atmospheric pressure

C. $-100°$ C and 5 atmospheric pressure

D. $500°$ C and 5 atmospheric pressure

Answer: C

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8. Van der Waal's constant 'a' and 'b' are related with _____ respectively.

A. Attractive force and bond energy of molecules

B. Volume and repulsive forces of molecules

C. Shape and repulsive of molecules

D. Attractive forces and volume of the molecules

Answer: D

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9. Van der Waal's equation of state is obeyed by real gases. For n moles of a real gas the expression will be

A. $\left(\dfrac{p}{n} + \dfrac{na}{V^2} \right) \left(\dfrac{V}{n-b} \right) = RT$

B. $\left(p + \dfrac{a}{V^2} \right)(V - b) = nRT$

C. $\left(p + \dfrac{na}{V^2} \right)(nV - b) = nRT$

D. $\left(p + \dfrac{n^2 a}{V^2} \right)(V - nb) = nRT$

Answer: D

10. In van der Waals' equation of state of the gas law the constnat 'b' is a measure of .

    A. intermolecular repulsions

    B. intermolecular attraction

    C. volume occupied by the molecules

    D. intermolecular collisions per unit volume

Answer: C

11. Molar volume of CO_2 is maximum at

    A. NTP

    B. $0°$ C and 2.0 atm

    C. $127°$ C and 1 atm

    D. $273°$ C and 2 atm

Answer: C

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12. To raise the volume of a gas by four times the following methods may be adopted. Which of the method is wrong ?

    A. T is doubled and P is also raised by four times

    B. Keeping P constant T is raised by four times

    C. Temperture is double and pressure is halved

D. Keeping temperature constant pressure is reduced to 1/4 of its

initial value

Answer: A

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13. An $L.P.G$ cylinder contains $15kg$ of butane gas at $27°C$ and 10

atm pressure It was leaking and its pressure fell down to 8 atm

pressure after one day Calculate the amount of leaked gas .

A. 1 kg

B. 2 kg

C. 3 kg

D. 4 kg

Answer: C

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14. Containers A and B have same gases. Pressure, volume and temperature of A are all twice that of B, then the ratio of number of molecules of A and B are

    A. $1:2$

    B. $2:1$

    C. $1:4$

    D. $4:1$

Answer: A

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15. For a fixed mass of a gas at constant temperature which of the following is correct?

A. Plot of V vs P is linear

B. Plot of V vs P is non =linear with intercept zero

C. Plot of PV vs P is linear with a zero slope

D. Plot of PV vs P is linear with positive slope

Answer: C

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16. A pre weighed vessel was filled with oxygen at N.T.P. and weighted.It was then evacuated, filled with SO_2 at the same temperature and pressure, and again weighed. The weight of oxygen will be

A. The same as that of the SO_2

B. Twice as that of the SO_2

C. Half of that of the SO_2

D. One-fourth of that of the SO_2

Answer: C

---

17. The correct value of the gas contant R is close to

A. 0,082 L-atm K

B. 0.082 L-atm $K^{-1}\text{mol}^{-1}$

C. 0.082 L atm $^{-1}K\text{mol}^{-1}$

D. $0.082L^{1}\text{atm}^{-1}$ K mol

Answer: B

---

18. Under what conditions will a pure sample of an ideal gas not only exhibit a pressure of $1atm$ but also a concentration of $1mollitre^{-1}$

$$[R = 0.082 \text{ iltre atm } mol^{-1}K^{-1}]$$

A. At STP

B. When V =22.4 L

C. When T =12 K

D. Impossible under any conditions

Answer: C

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19. What is the nature of graph of PV versus P for a given mass of a gas at constant temperature?

A. Parallel to X-axis

B. Parallel to Y-axis

C. Linear with positive slope

D. Linear with negative slope

Answer: A

20. Ideal gas equation strictly obeys gas laws under all conditions of

   A. A few selected experimental conditions

   B. All experimental conditions

   C. Low pressure alone

   D. High temperature alone

Answer: B

21. In the equation of state of an ideal gas `PV = nRT, the value of universal gas constant would depend only on :

A. The nature of the gas

B. The pressure of the gas

C. The units of the measurement

D. None of these

Answer: C

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22. Which one of the following is not the value of R ?

A. 1.987 cal $K^{-1}\mathrm{mol}^{-1}$

B. 8.3 cal $K^{-1}mol^{-1}$

C. 0.0821 lit $K^{-1}\mathrm{mol}^{-1}$

D. 1.987 joules $K^{-1}\mathrm{mol}^{-1}$

Answer: A

23. S.I. unit of gas constant R is

A. 0.0821 litre atm $K^{-1}\mathrm{mole}^{-1}$

B. 2 calories $K^{-1}\mathrm{mole}^{-1}$

C. 8.314 joule $K^{-1}\mathrm{mole}^{-1}$

D. None of these

Answer: C

24. If two mole of an ideal gas at $546K$ occupies a volume of $44.8 litres$, the pressure must be :

A. 2 atm

B. 3 atm

C. 4 atm

D. 1 atm

Answer: A

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25. Volume occupied by an ideal gas at one atmospheric pressure and $0°C$ is V ml. Its volume at 273 K will be

A. V ml

B. v/2 ml

C. 2V

D. 4V

Answer: A

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26. Volume of 0.5 mole of a gas at 1 atm. Pressure and 273 K is

A. 22.4 litres

B. 11.2 litres

C. 44.8 litres

D. 5.6 litres

Answer: B

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27. Pure hydrogen sulphide is stored in a tank of 100 litre capacity at $20°$ C and 2 atm pressure. The mass of the gas will be

A. 34 g

B. 340 g

C. 282.4 g

D. 28.24 g

28. One litre of a gas weights 2 g at 300 K and 1 atm pressure. If the pressure is made 0.75 atm at which of the following temperature will one litre of the same gas weight one gram ?

A. 450 K

B. 600 K

C. 800 K

D. 900 K

29. A weather balloon filled with hydrogen at 1 atm and $27°C$ has volume equal to 1200 litres. On ascending, it reaches a place where temperture is $-23°C$ and pressure is 0.5 atm. The volume of the balloon is

    A. 24000 litres

    B. 20000 litres

    C. 10000 litres

    D. 12000 litres

Answer: B

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30. At STP 1g CaCO₃ on decomposition gives CO_2

    A. 22.4 litre

B. 2.24 litre

C. 0.224 litre

D. 11.2 litre

Answer: C

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31. Containers A and B have same gases. Pressure, volume and temperature of A are all twice that of B, then the ratio of number of molecules of A and B are

A. $1:2$

B. $2:1$

C. $1:4$

D. $4:1$

Answer: B

32. A cylinder of 5 L capacity, filled with air at NTP is connected with another evacuated cylinder of 30 L capacity. The resultant air pressure in both the cylinders will be

   A. 10.8 cm of Hg

   B. 14.9 cm of Hg

   C. 21.8 cm of Hg

   D. 38.8 cm of Hg

Answer: A

33. The pressure and temperature of $4dm^3$ of carbon dioxide gas are doubled. Then the volume of carbon dioxide gas would be

A. $2\ dm^3$

B. $3\ dm^3$

C. $4\ dm^3$

D. $8\ dm^3$

Answer: C

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34. For H_2 gas, the compressibility factor,Z = PV $/$n RT is -

A. Equal to 1

B. Equal to 0

C. Always greater than 1

D. Initially less than 1 and then becomes greater than 1 at high

pressures

Answer: C

---

35. At lower temperatures all gases show

    A. negative deviation

    B. positive deviation

    C. First positive and then negative deviation

    D. First negative and then positive deviation

Answer: D

---

36. A gas is said to behave like an ideal gas when the relation $\frac{pV}{T}=$ constant. When do you expect a real gas to behave like an ideal gas ?

A. When the temperature is low

B. When both the temperature and pressure are low

C. When both the temperature and pressure are high

D. When the temperature si high and pressure is low

Answer: D

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37. When is deviation more in the behaviour of a gas from the ideal gas

equation $PV = nRT$?

A. At high temperature and low pressure

B. At low temperature and high pressure

C. At high temperature and high pressure

D. At low temperature and low pressure

Answer: B

38. At which one of the following temperature pressure conditions, the deviation of a gas from ideal behavior is expected to be minimum?

A. 350 K and 3atm

B. 550 K atm 1 atm

C. 250 K and 4 atm

D. 450 K and 2 atm

Answer: B

39. Any gas shows maximum deviation from ideal gas behaviour at

A. $0°$C and 1 atmospheric pressure

B. $100°$C and 2 atmospheric pressure

C. $-100°$C and 5 atmospheric pressure

D. $500°$C and 1 atmospheric pressure

Answer: C

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40. A gas deviated from ideal behaviour at a high pressure because its molecules

A. Have kinetic energy

B. Are bound by covalent bonds

C. Attract one another

D. Show the Tyndall effect

Answer: C

Liquefaction Of Gases Critical Teperature Pressure And Volume

1. For H_2 gas, the compressibility factor,Z = PV $/$n RT is -

    A. Equal to 1

    B. Equal to 0

    C. Always greater than 1

    D. Initially less than 1 and then becomes greater than 1 at high

       pressures

Answer: C

2. When a compressed gas is allowed to expand through a porous plug at temperature above its inversion temperature there is

    A. a fall in temperature

    B. a rise in temperature

    C. neither a fall nor a rise in temperature

    D. a fall in temperature first followed by a rise in temperature

Answer: B

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3. The Joule -Thomson coefficient for a gas is zero at .

    A. Inversion temperature

    B. Critical temperature

    C. Absolute temperature

D. Below 0° C

Answer: A

4. An ideal gas obeying the kinetic theory of gases can be liquefied if

    A. its tempereature is more than critical temperature T_C

    B. its pressure is more than critical pressure P_C

    C. its pressure is more than P_C at a temperature less than T_C

    D. it cannot be liquified at any value of P and T

Answer: D

5. At the critical temperature

A. liquid and vapour exist in equilibrium

B. vapour state does not exist at all

C. the meniscus between liquid and vapour disappears

D. the vapour condense into solid

Answer: C

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6. Dominance of strong repulsive forces among the molecules of the gas ($Z = $ compressibility factor)

A. depends on Z and indicated by Z=1

B. depends on Z and inddicated by $Z > 1$

C. depends on Z and inddicated by $Z < 1$

D. is independent of Z

Answer: B

7. A gas is liquified

     A. above critecal temperature and below critical pressure

     B. below critical temperature and above critical pressure

     C. below critical tempreature and pressure

     D. above critical and pressure

Answer: B

8. The compressibility factor for an ideal gas is

     A. 1.5

B. 1.0

C. 2.0

D. ∞

Answer: B

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9. The compressibility factor of gases is less than unity at STP. Therefore,

A. $V > 22.4$ litres

B. $V < 22.4$ litres

C. V=22.4 litres

D. V=44.8 litres

Answer: B

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10. Dominance of strong repulsive forces among the molecules of the gas ($Z =$ compressibility factor)

    A. depends on Z and indicated by Z=1

    B. depends on Z and inddicated by $Z > 1$

    C. depends on Z and inddicated by $Z < 1$

    D. is independent of Z

Answer: B

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

    A. Critical tempreature

B. Boyle temperature

C. Inversion temperature

D. Reduced temperature

Answer: B

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12. The critical temperature of a substance is

A. The temperature above which the substance decomposes

B. The temperature above which a substance can esist only as a gas

C. Melting point of the substance

D. Boiling point of the substance

Answer: B

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13. NH_3 can be liquefied at ordinary temperature without the application of pressure. But O_2 cannot be because :

A. Its critical temperature is very high

B. Its critical temperature is low

C. Its critical temperature is moderate

D. Its critical temperature is higher than that of ammonia

Answer: B

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14. At the critical temperature , the substance exists as a

A. Liqued and vapour exist in equilibrium

B. vapour state does not exist at all

C. the meniscus between liquid and vapour disappears

D. the vapour condense into solid

Answer: C

---

15. The deviation from the ideal gas behaviour of a gas can be expressed as

A. $Z = \dfrac{P}{VRT}$

B. $Z = \dfrac{PV}{nRT}$

C. $Z = \dfrac{nRT}{VP}$

D. $Z = \dfrac{VR}{PT}$

Answer: B

16. An ideal gas cannot be liquified because

    A. Its critical temperature is always above $0°$ C

    B. Its molecules are relatively smaller in size

    C. Its solidifies before becoming a liquid Forces operating between

       its molecule are negligible

    D.

Answer: D

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17. Which of the following method is used for liquefaction of gases ?

    A. Daltons Method

    B. Boyle's Method

    C. Linde's method

D. Charle's method

Answer: C

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18. Which set of conditions represent the easiest way to cool a gas ?

A. Low temperature and high pressure

B. High temperature and low pressure

C. Low temperature and low pressure

D. High temperature and high pressure

Answer: A

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19. A gas is liquified

A. above critecal temperature and below critical pressure

B. below critical temperature and above critical pressure

C. below critical tempreature and pressure

D. Above temperature and pressure

Answer: C

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20. Liquefaction of gases is based on the principle of

A. Thermodynamics

B. Inductive effect

C. Joule-Thomson effect

D. Hyper conjugation

Answer: C

21. Critical temperature of H_2O, NH_3, CO_2 and O_2 are 647 K, 405.6 K, 304.10 K and 1542 K respectively. If the cooling starts from 500 K to their critical temperature, the gas that lilquiefies first is

A. H_2O

B. NH_3

C. CO_2

D. O_2

Answer: B

22. Consider the equation $Z = \dfrac{PV}{RT}$. Which of the following statements is correct?

A. When Z $>$ 1 real gases are easier to compress than the ideal gas

B. When Z=1 real gases get compressed easily

C. When Z $>$ 1 real gases are difficult to compress

D. When Z=1 real gases are difficult to compress

Answer: C

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Kinetic Theroy Molecule Speeds

1. When a gas is compressed as constant temperature:

A. the speeds of the molecules increase

B. the collisions between the molecules increase

C. the speeds of the molecules decrease

D. the collisions between the molecules decrease

Answer: B

2. According to kinetic theory of gases the root mean square velocity is directly proportional to

A. T

B. T^2

C. $\sqrt{T}$

D. $1/T$

Answer: C

3. Which one of the following relationship is correct ?

A. $PV = \dfrac{3}{2}kT$

B. $K.E. = \dfrac{2}{3}kT$

C. $Z = \dfrac{PV}{nRT}$

D. $(PV) = \dfrac{2}{3}k$

Answer: D

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4. Which of the following is correct relation for root mean square velocity ?

A. $u_{rms} = \sqrt{\dfrac{8RT}{\pi M}}$

B. $u_{rms} = \sqrt{\dfrac{3RT}{M}}$

C. $u_{rms} = \sqrt{\dfrac{2RT}{M}}$

D. $u_{rms} = \dfrac{3RT}{M}$

Answer: B

5. The ratio of root mean square velocity of average velocity of a gas molecule at a particular temperture is

    A. $1.086 : 1$

    B. $1 : 1.086$

    C. $2 : 1.086$

    D. $1.086 : 2$

Answer: A

6. Which of the following is valid at absolute zero ?

A. Kinetic energy of the gas becomes zero but not the molecular

motion

B. Kinetic energy of the gas becomes zero and the molecular

motion also becomes zero

C. Kinetic energy of the gas decreases but does not become zero

D. None of these

Answer: B

7. The rms speed at NTP of a gas can be calculated from the expression:

A. $\sqrt{\dfrac{3P}{d}}$

B. $\sqrt{\dfrac{3PV}{M}}$

C. $\sqrt{\dfrac{3RT}{M}}$

D. All of the above

Answer: D

---

8. Root mean square velocity of a gas molecule is proprotional to

   A. $m^{1/2}$

   B. m^0

   C. $m^{-1/2}$

   D. m

Answer: C

---

9. The ratio among most probable velocity, mean velocity and root mean velocity is given by

A. $1:2:3$

B. $1:\sqrt{2}:\sqrt{3}$

C. $\sqrt{2}:\sqrt{3}:\sqrt{8/\pi}$

D. $\sqrt{2}:\sqrt{8/\pi}:\sqrt{3}$

Answer: D

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10. If $C_1, C_2, C_3, \ldots$ represent the speeds on $n_1, n_2, n_3, \ldots$

molecules, then the root mean square speed is

A. $\dfrac{n_1C_1^2 + n_2C_2^2 + n_3C_3^2 + \cdots}{n_1 + n_2 + n_3 + \cdots}$

B. $\dfrac{\left(n_1C_1^2 + n_2C_2^2 + n_3C_3^2 + \cdots\right)^{1/2}}{n_1 + n_2 + n_3 + \cdots}$

C. $\dfrac{\left(n_1C_1^2\right)^{1/2}}{n_1} + \dfrac{\left(n_2C_2^2\right)^{1/2}}{n_2} + \dfrac{\left(n_3C_3^2\right)^{1/2}}{n_3} + \cdots$

D. $\left[\dfrac{\left(n_1C_1 + n_2C_2 + n_3C_3 + \cdots\right)^2}{\left(n_1 + n_2 + n_3 + \cdots\right)}\right]^{1/2}$

Answer: A

---

11. Internal energy and pressure of a gas per unit vloume are related as

:

A. $P = \dfrac{2}{3}E$

B. $P = \dfrac{3}{2}E$

C. $P = \dfrac{1}{2}E$

D. P=2E

Answer: A

12. 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. $1/\sqrt{d}$

Answer: A

13. Collision frequency (Z) of a gas at a particular pressure

   A. decreases with the rise in temperature

   B. increases with the rise in temperature

   C. decrease initially and thereafter increases

D. unpredictable

Answer: B

14. The integrated form of Clausius-Clapeyron equation is

A. $\dfrac{d\ln K}{dT} = \dfrac{\Delta H}{RT^2}$

B. $\log_{10}\dfrac{K_2}{K_1} = \dfrac{\Delta H}{2.303R}\left(\dfrac{1}{T_1} - \dfrac{1}{T_2}\right)$

C. $\log_{10}\dfrac{P_2}{P_1} = \dfrac{Hvap}{2.303R}\left(\dfrac{1}{T_1} - \dfrac{1}{T_2}\right)$

D. None of these

Answer: C

15. The Clausius-Clapeyron equation depics

A. the effect of temperature on the vapour pressure of a liquid

B. effect of pressure on the boilling point of a liquid

C. effect of temperature on suface tension of liquid

D. Both (a) and (b)

Answer: D

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16. At what temperature will the rms velocity of SO_2 be the same as that of $O_2 at 303 K$?

A. 273 K

B. 606 K

C. 303 K

D. 403 K

Answer: B

---

17. The root mean square velocity of one mole of a monoatomic gas having molar mass M is $U_{r.m.s.}$. The relation between the average kinetic energy (E) of the gas and U_{rms} is

A. $U_{rms} = \sqrt{\dfrac{3E}{2M}}$

B. $U_{rms} = \sqrt{\dfrac{2E}{3M}}$

C. $u_{rms} = \sqrt{\dfrac{2E}{M}}$

D. $u_{rms} = \sqrt{\dfrac{E}{3M}}$

Answer: C

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

    A. Kinetic energy of the molecules decrease

    B. pressure of the gas increases

    C. Kinetic energy of the molecules remains the same

    D. number of molecules of the gas increases

Answer: C

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Liquid State Vapour Pressure Surface Tension And Viscosity

1. The correct statement regarding liquid state is

    A. A liquid resembles a solid near the melting point of the solid

    B. A liquid resembles a gas near the critical temperature of the gas

C. A liquid has short range order and long range disorder

D. All of the above

Answer: D

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2. Which one of the following is not correct about boilling and evaporation ?

A. Evaporation takes place at all temperature whereas boilling takes place only at one particular temperature

B. Evaporation takes place only from the surface whereas boilling involves formation of bubbles below the surface

C. Boilling can takes place in closed as well as open vessel whereas evaporation takes place only in open vessel

D. Boilling point decreases if external pressure is low but evaporation increases if external pressure is low

Answer: C

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3. At the higher altitudes the boiling point of water lowers because

A. atmosheric pressure is low

B. temperature is low

C. atmoshperic pressure is high

D. None of these

Answer: A

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4. Vapour pressure of a liquid depends upon its

    A. the amount on the liqiud taken

    B. the temperature of ht liquid

    C. both on the amount as well as temperature

    D. neither the amount nor the temperature but only on the nature

       of the liquid

Answer: B

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5. Pressure cooker reduces cooking time because :

    A. the heat is more easily distributed

    B. the higher pressure tenderizes the food

    C. the boiling point of the water inside is elevated

D. a large flame is used

Answer: C

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6. The unit of surface tension in SI system is

A. dynes cm^{-1}

B. ergs/cm

C. joules m^{-1}

D. Nm^{-1}

Answer: D

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7. The SI unit of the coefficent of viscosity is

A. kg $s^{-1}m^{-2}$

B. kg $m^{-1}s^{-1}$

C. kg $cm^{-1}s^{-1}$

D. g $m^{-1}s^{-1}$

Answer: B

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8. With the increasesing molecular weight of a liquid the viscosity

A. decreases

B. increases

C. no effect

D. all are wrong

Answer: B

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

    A. Dipole -dipole interaction

    B. Covalent bonds

    C. London dispersion forces

    D. hydrogen bonding

Answer: D

10. On heating a liquid its surface tension

    A. Increases

    B. Decreases

C. Remains same

D. Is reduced to zero

Answer: B

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11. The SI unit of the coefficent of viscosity is

A. kg $s^{-1}m^{-2}$

B. kg $m^{-1}s^{-1}$

C. kg $cm^{-1}s^{-1}$

D. g $m^{-1}s^{-1}$

Answer: B

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12. Which of the following expressions regarding the unit of coefficient of viscosity is not true?

A. Dyne cm^{-2} sec

B. Dyne cm^2 sec^{-1}

C. N m^{-2} sec

D. Kg $m(-1)s^{-1}$

Answer: B

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13. Which of the following statements is correct if the intermolecular forces in liquid A, B and C are in the order $A < B < C$?

A. B evaporates more readily than A

B. B evaporates less readily than C

C. A and B evaporate at the same rate

D. A evaporates more readily than C

Answer: D

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14. When the temperature is raise, the viscosity of liquid decreases, this is because,

    A. Decreased volume of the solution

    B. Increases in temperature increases the average kinetic energy of

        molecules which overcome the attractive forces between them

    C. Decreased covalent and hydrogen bond forces

    D. Increased attraction between the molecules

Answer: B

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15. Generally liquid drops assume spherical spape because

A. A sphere has maximum surface area

B. A sphere has minimum surface area

C. Sphere is symmetrical in shape

D. None of these

Answer: B

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16. On heating a liquid its surface tension

A. Increases

B. Decreases

C. Remains same

D. Is reduced to zero

Answer: B

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17. The internal resistance of a cell is the resistance of

    A. Fluidity

    B. Specific resistance

    C. Viscosity

    D. Surface tension

Answer: C

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18. As the temperature rises viscosity of liquids

    A. Increase

B. Decreases

C. Remains constant

D. May increases or decreases

Answer: B

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19. Which of the following liquids has the highest viscosity ?

A. Benzene

B. Carbon disulphide

C. Acetone

D. Ethanol

Answer: D

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1. Which of the following expression represents correctly the variation of density of an ideal gas with change in temperature ?

A. $d_2 = \dfrac{P_2 T_1 d_1}{P_1 T_2}$

B. $d_2 = \dfrac{d_1 T_1}{T_2}$

C. $d_2 = \dfrac{d_1 T_2}{T_1}$

D. $d_2 = \dfrac{d_1 P_2 T_2}{P_1 T_1}$

Answer: A

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2. The vapour density of a gas (X) is 11.2. The volume occupied by 11.2 g of this gas at N.T.P. is

A. 1 L

B. 11.2 L

C. 22.4 L

D. 20 L

Answer: B

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3. With increase in temperature the difference between rms velocity and average velocity will

A. increase

B. Decreases

C. remain same

D. decrease becoming almost zero at a high temperature

Answer: A

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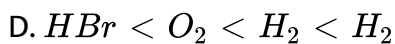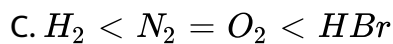**4.** The average K.E. of an ideal gas is calories per mole is approximately equal to
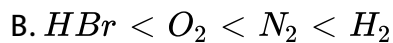
    A. three times the absolute temperature

    B. absolute temperature

    C. two times the absolute temperature

    D. 1.5 times the absolute temperature

Answer: A

5. At STP, the order of mean square velocity of molecules of H_2, N_2, O_2, and HBr is

    A. $H_2 < N_2 < O_2 <$ HBr

B. $HBr < O_2 < N_2 < H_2$

C. $H_2 < N_2 = O_2 < HBr$

D. $HBr < O_2 < H_2 < H_2$

Answer: B

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6. If the inversion temperature of a gas is $-80°C$, then it will produce

cooling under Joule-Thomson effect at

A. 298 K

B. 273 K

C. 193 K

D. 173 K

Answer: D

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7. A closed vessel contains equal number of nitrogen and oxygen molecules at pressure of $Pmm.$ If nitrogen is removed from the system, then the pressure will be:

A. P

B. $2P$

C. P/2

D. P^2

Answer: C

8. In which of the following states of matter the average distance between the molecules lies between 10^{-5} cm to 10^{-7} cm ?

A. Solid

B. Liquid

C. Gas

D. None

Answer: B

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9. Why liquids diffuse slowly as compared to gases?

A. the molecules are held together by strong intermolecular forces

B. the molecular of liquids are heavy

C. liquids have definite shape

D. the molecules of liquids undergo large number of collisions with

the neighbouring molecules

Answer: D

10. During boiling og a liquid bubbles are formed because

    A. the vapour pressure inside the bubbles is equal to the atmospheric pressure

    B. the vapour pressure inside the bubbles is slightly greater than the atmospheric pressure

    C. the vapour pressure inside the bubbles is slightly greater than the atmospheric pressure

    D. the dissolved air gets entrapped which is being expelled

Answer: B

11. The heats of vaporization of H_2O, C_2H_5OH and CS_2 are 40.6 kJmol^{-1}, 38.6kJmol^{-1} and 26.8kJmol^{-1} respectively. The strength of intermolecular forces in these liquids is in the order of _____.

A. $H_2O > C_2H_5OH > CS_2$

B. $CS_2 > C_2H_5OH > H_2O$

C. $H_2O > CS_2 > C_2H_5OH$

D. $CS_2 > H_2O > C_2H_5OH$
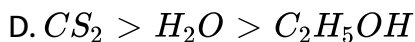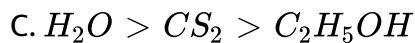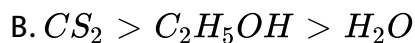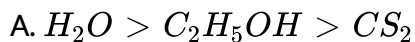
Answer: A

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12. Which one of the following is not correct about liquids ?

A. The intermolecular forces of attraction in a liquid are quite large

B. All liquids are accompanied by cooling on evaporation

C. Lower the boiling point of a liquid greater is its vapour pressure

   at room temperature

D. A liquid boils at a higher temperature at the top of a mountain

   than at the sea level

Answer: D

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13. A closed flask contains water in all its three states solid, liquid and vapour at $0°C$. In this situation, the average kinetic energy of water molecules will be

A. the greatest in all the three states

B. the greatest in vapour state

C. the greatest in the liquid state

D. the greatest in the solid state

Answer: B

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14. The critical temperature of water is higher than that of O_2 because the H_2O molecule has

A. fewer electrons than O_2

B. two covalent bonds

C. V-shape

D. dipole moment

Answer: D

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15. The approximate temperature at which 1 mol L^{-1} of a sample of pure ideal gas exhibits a pressure of 101.325 k Pa is

A. 12.2 K

B. 122 K

C. 244 K

D. 300 K

Answer: A

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16. If the pressure and absolute temperature of 2 litres of CO_2 are doubled the volume of CO_2 would become

A. 2 litres

B. 4 litres

C. 5 litres

D. 7 liters

Answer: A

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17. The density of methane at 2.0 atmosphere pressure at $27°C$ is

A. 0.13 gL^{-1}

B. 0.26 g L^{-1}

C. 1.30 g L^{-1}

D. 26.0 g L^{-1}

Answer: C

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18. The density of a gas at $27°C$ and $1atm$ is d. Pressure remaining constant, at which of the following temperture will its density become $0.75d$?

    A. $20°$ C

    B. $30°$ C

    C. 400 K

    D. 300 K

Answer: C

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19. A vessel is filled with a mixture of oxygen and nitrogen. At what ratio of partial pressures will the mass of gases be identical?

    A. $p(O_2) = 0.5\ p(N_2)$

    B. $p(O_2) = p(N_2)$

C. $p(O_2) = 1.14 \, p(N_2)$

D. $p(O_2) = 0.875 \, p(N_2)$

Answer: D

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20. At constant temperature $200cm^3$ of N_2 at 720 mm and $400cm^3$ of O_2 at 750 mm presure are put together in a litre flask. The final pressure of mixture is

A. 735 mm

B. 1470 mm

C. 1095 mm

D. 740 mm

Answer: D

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21. If three unrective gases having partial pressures P P_B and P_C and theire moles are 1,2 and 3 respectively then their total pressure will be

A. $P = P_A + P_B + P_C$

B. $P = \dfrac{P_A + P_B + P_C}{6}$

C. $P = \dfrac{\sqrt{P_A + P_B + P_C}}{3}$

D. none

Answer: A

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22. The ratio of rates of diffusion of SO_2, O_2 and CH_4 is

A. $1 : \sqrt{2} : 2$

B. $1 : 2 : 4$

C. $2 : \sqrt{2} : 1$

D. $1 : 2 : \sqrt{2}$

Answer: A

23. At what temperature is the $K.E.$ Of a gas molecules half that of its value at $27°C$

A. $13.5°$ C

B. $150°$ C

C. 75 K

D. $-123K$

Answer: C

24. The rate of diffusion of two gases X and Y is in the ration of $1:5$ and that of Y and Z in the ratio of $1:6$. The ratio of the rate of diffusion of Z with respecte to X is :

A. $5/6$

B. $1/30$

C. $6/5$

D. 30

Answer: D

25. The density of helium is 0.1782 g per litre at N.T.P. Its density at $27°$ C and 740mm Hg will be

A. $\dfrac{0.1782 \times 300 \times 760}{273 \times 740}$ g per litre

B. $\dfrac{0.1782 \times 300 \times 740}{273 \times 760}$ g per litre

C. $\dfrac{0.1782 \times 273 \times 740}{300 \times 740}$ g per litre

D. $\dfrac{0.1782 \times 273 \times 740}{300 \times 760}$ g per litre

Answer: D

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26. When equal weights of O_2 and N_2 are placed in separate contaniners of equal volume at the same temerature which of the following statement is true ?

    A. Both flasks cotain the same number of molecules

    B. The pressure in oxygen flask is smaller than the one in the nitrohgen flask

    C. More molecules are present in the oxygen flask

D. Molecules in the nitrogen flask are moving slower on the average

than ones in the oxygen flask

Answer: B

27. Two flasks X and Y have capacity 1 L and 2 L respectively and each of them contains 1 mole of a gas. The temperature of the flasks are so adjusted that average speed of molecules in X is twice as those in Y. The pressure in flask X would be

A. same as that in Y

B. half of that in Y

C. twice of that in Y

D. 8 times of that in Y

Answer: D

28. To raise the volume of a gas by four times the following methods may be adopted. Which of the method is wrong ?

    A. T is doubled and P is also doubled

    B. Keeping P constant T is raised by four times

    C. Temperture is double and pressure is halved

    D. Keeping temperature constant pressure is reduced to 1/4 of its

       initial value

Answer: A

29. 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: B

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30. Reducing the pressure from 1.0 to 0.5 atm would change the number of molecules in one mole of ammonia to

A. 75% of initial value

B. 50% of initial value

C. 25% of initial value

D. None of these

Answer: D

---

31. In what ratio by mass carbon monoxide and nitrogen should be mixed so that partial pressure exerted by each gas is same ?

    A. $1:1$

    B. $1:2$

    C. $2:1$

    D. $3:4$

Answer: A

32. If the four tubes of a car are filled to the same pressure with N_2, O_2, H_2, and helium separately , then which one will be filled first ?

A. N_2

B. O_2

C. H_2

D. Ne

Answer: C

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33. Equal volumes of gases at the same temperature and pressure contain equal number of particles. This statement is a direct consequence of

A. Perfect gas law

B. Charles's law

C. Ideal gas equation

D. Partial law of pressure

Answer: C

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34. If the rms speed of gas molecules is $x cms^{-1}$ at a pressure of p atmospheres, then the rms speed at a pressure of $2p$ atmospheres and constant temperature will be

A. x

B. 2x

C. 4x

D. x/4

Answer: C

35. Containers A and B have same, gases. Pressure, volume and temperature of A are all twice that of B, then the ratio of number of molecules of A and B are

A. $1:2$

B. $2:1$

C. $1:4$

D. $4:1$

Answer: B

Numericals

1. If $10g$ of a gas at atmospheric pressue is cooled from $273°\,C$ to $0°\,C$, keeping the volume constant, its pressure would become

A. $\dfrac{1}{2}$ atm

B. $\dfrac{1}{273}$ atm

C. 2 atm

D. 273 atm

Answer: A

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2. In case of Boyle's law, if the pressure is increased by 1% the percentage decrease in volume is

A. 0.01

B. $\dfrac{100}{101}\%$

C. $\dfrac{1}{100}\%$

D. $\dfrac{1}{100}\%$

Answer: B

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3. At what temperature in the Celsius scale, V (volume) of a certain mass of a gas at $27°C$ will be doulbed keeping the pressure constant ?

A. $54°$

B. $327°$

C. $427°$

D. $527°$

Answer: B

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4. At constant pressure,a gas was compressed to half of its volume at $30°$ C. To what temperature it should be heated so that its volume increases to double of its original volume ?

    A. $60°$ C

    B. 303 K

    C. 240 K

    D. 606 K

Answer: D

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5. Equal volume of two gases which do not react together are enclosed in separate vessels. Their pressures are 10mm and 400mm respectively. If the two vessels are joined together, then what will be the pressure of the resulting mixture (temperature remaining constant)?

A. 125 mm

B. 500 mm

C. 1000 mm

D. 250 mm

Answer: D

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6. 160 mL of a gas are collected over water at 25° C and 768.8 mm Hg

A. 760 mm Hg

B. 721.2 mm Hg

C. 600 mm Hg

D.

Answer: A

7. Gaseous mixture of contains 56 g of N_2 , 44g of CO_2 and 16 g of CH_4 . The total pressure of mixture is 720 mm of Hg . The partial pressure of CH_4 is :-

A. 180 mm

B. 360 mm

C. 540 mm

D. 720 mm

Answer: A

8. The Graham's law states that "at constant pressure and temperature the rate of diffusion or effusion of a gas is inversely proportional to the squar root of its density Rate of diffusion $\propto \dfrac{1}{\sqrt{d}}$

If r_1 and r_2 represent the rates of diffusion of two gases and d_1 and d_2 are their respective densities, then

$$\frac{r_1}{r_2} = \sqrt{\frac{d_2}{d_1}}$$

$$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1} \times \frac{P_1}{P_2}}$$

$$\frac{V_1 \times t_2}{V_2 \times t_1} = \sqrt{\frac{d_2}{d_1}} = \sqrt{\frac{M_2}{M_1}}$$

$V \propto n$ (where n is no of moles)

$V_1 \propto n_1$ and $V_2 \propto n_2$

If some moles of O_2 diffuse in 18 sec and same moles of other gas diffuse in 45 sec then what is the molecular weight of the unknown gas ?.

A. $\dfrac{45^2}{18^2} \times 32$

B. $\dfrac{18^2}{45^2} \times 32$

C. $\dfrac{18^2}{45^2 \times 32}$

D. $\dfrac{45^2}{18^2 \times 32}$

Answer: B

9. The rate of diffusion of oxygen as compared with ozone will be

A. 1.5 times

B. 1.22 times

C. 0.66 times

D. 0.82 times

Answer: A

10. If two gases X and Y have their molecules travelling at the velocities in the ratio of $3 : 1$. The ration of their molecular mass M_x / M_y will be

A. $\dfrac{1}{9}$

B. 9

C. 3

D. $\dfrac{1}{3}$

Answer: B

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11. The molecular weight of a gas which diffuses through a porous plug at $1/6^{th}$ of the speed of hydrogen under identical condition is:

A. 27

B. 72

C. 36

D. 48

Answer: C

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12. The density of a gas A is three times that of a gas B. It the molecular mass of A is M, the molecular mass of B is

A. 3M

B. $\sqrt{3M}$

C. $\dfrac{M}{3}$

D. $\dfrac{M}{\sqrt{3}}$

Answer: C

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13. A bottle of cold drink has 200 mL liquid in which CO_2 is 0.1 molar. If CO_2 behaves as ideal gas the volume of CO_2 at S.T.P. solution of cold drink is

A. 0.224 litres

B. 0.448 litres

C. 22.4 litres

D. 2.24 litres

Answer: B

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14. One day when the temperature and pressure were 300 K and 760 mm a mass of gas had a volume ofg 1200 c.c. On the next day the volume had changed to 1218 cm^3 while the pressure was the same . What was the temperature on the second day ?

A. 273° K

B. 31.5° K

C. 31.5° K

D. 300 K

Answer: B

---

15. A pre weighed vessel was filled with oxygen at N.T.P. and weighted.It was then evacuated, filled with SO_2 at the same temperature and pressure, and again weighed. The weight of oxygen will be

    A. The same as that of the SO_2

    B. $\dfrac{1}{2}$ that of SO_2

    C. twice that of SO_2

    D. one fourth that of SO_2

Answer: B

16. One litre of a gas collected at S.T.P. will occupy _____ at 4 atomosphere and 310 K.

A. $1 \times \dfrac{4}{1} \times \dfrac{310}{273}$ litres

B. $1 \times \dfrac{1}{4} \times \dfrac{310}{273}$ litres

C. $1 \times \dfrac{4}{1} \times \dfrac{37}{273}$ litres

D. $1 \times \dfrac{4}{1} \times \dfrac{273}{310}$ litres

Answer: B

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17. A balloon filled with methane is pricked with a sharp point and quickly plunged into a tank of hydrogen at the same pressure. After sometime, the balloon will have

A. Enlarged

B. Collapsed

C. Remained unchanged in size

D. None of the above

Answer: A

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18. A flask containing methane gas was weighed at a measured temperature and pressure. The flask was emptied and then filled with oxygen at the same temperature and pressure. The weight of methane vapour will be about

A. the same as that of oxgen

B. one half as heavy as oxygen

C. one fifth as heavy as oxygen

D. five times as heavy as oxygen

Answer: B

19. A weather balloon filled with hydrogen at 1 atm and 300K has volume equal to 12000 litres. On ascending it reaches a place where temperature is 250K and pressure is 0.5atm. The volume of the balloon is:

A. 24000 litres

B. 20000 litres

C. 10000 litres

D. 12000 litres

Answer: B

20. A discharge tube of volume 30 dm^3 was sealed off during an experiment at a pressure of 8.2×10^{-10} atm .at $27°$ C. The number of gas molecules remaining in the sealed tube is

A. 6.023×10^{-20}

B. 6.023×10^{18}

C. 6.023×10^{14}

D. 6.023×10^{23}

Answer: C

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21. A spherical balloon of 18 cm diameter is to be filled uo with gas at NTP from a gas cylinder containing the gas at 30 atm. Pressure at $27°$ C . If the gas cylinder can hold 3 litres of water the number of balloons that can be fully filled is

A. 400

B. 26

C. 100

D. 50

Answer: B

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22. A cylinder containing cooking gas can withstand a pressure of $15atm$. The pressure gauge of the cylinder indicates $12atm$ at $27°C$. Due to a sudden fire in the building, the temperature starts rising. At what temperature will the cylinder explode?

A. 1000 K

B. 375 K

C. 550 K

D. 225 K

Answer: B

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23. An open flask contains air at $27°$ C and one atm. Pressure. The flask is heated to $127°$ C at the same pressure . The fraction of original air remaining in the flask will be

A. $\dfrac{1}{5}$

B. $\dfrac{2}{5}$

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

D. $\dfrac{3}{4}$

Answer: D

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24. Five grams each of the following gases at $87°C$ and 750 mm pressure are taken. Which of them will have the least volume ?
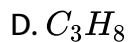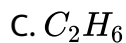
A. HF

B. HCl

C. HBr

D. HI

Answer: D

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25. 10 mL of a gaseous hydrocarbon require 30 mL of oxygen for complete combustion. The ihydrocarbon is
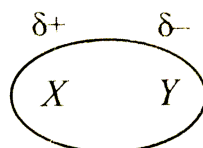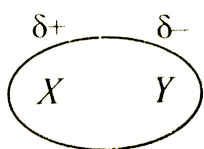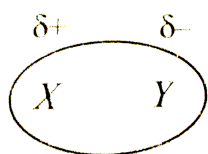
A. C_2H_4

B. C_2H_2

C. C_2H_6

D. C_3H_8

Answer: A

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26. Study the figures below and identify the type of interaction between XY-XY molecules.

A. Dipole-Induced dipole

B. Dipole-Dipole

C. Dispersion forces

D. Induced dipole-Induced dipole

Answer: B

27. What is the relationship between thermal energy and intermolecular interaction energy of a substance in three states in terms of X and Y?

Solid → Liquid → Gas

Predominance of Y →

← Predominance of X

A. X-thermal energy , Y-intermolecular interactios

B. X-thermal energy , Y-thermal energy

C. X-intermolecular interactions ,Y -thermal energy

D. X-intermolecular interations , Y- intermolecular interactions

Answer: C

28. Atmospheric pressure recorded in different cities are as follows :

Cities	Shimla	Bhopal	Agra	Chennai
p (in N/m^2)	1.01×10^5	1.2×10^5	1.02×10^5	1.21×10^5

Consider the above data and mark the place at which liquid will boil first.

A. Shimla

B. Bhopal

C. Agra

D. Chennai

Answer: A

29. The drain cleaner Drainex contains small bits of aluminium which react with caustic soda to produce hydrogen What volume of hydrogen at $20°C$ aand one bar will be released when $0.15g$ of aluminium reacts ? .

    A. 204 mL

    B. 200 mL

    C. 203 mL

    D. 400 mL

Answer: C

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30. For a real gas the compressibility factor Z has different values at different temperatures and pressure. Which of the following is not correct under the given conditions ?

A. $Z < 1$ at very low pressure

B. $Z > 1$ at high pressure

C. Z=1 under all conditions

D. Z=1 at intermediate pressure

Answer: C

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31. Study the following graph and mark the incorrect statement following it.

A. At zero volume all lines meet at $-273.15°$ C. This temperature is known as absolute zero.

B. Each line of the volume vs temperature at constant pressure of graph is called isotherm

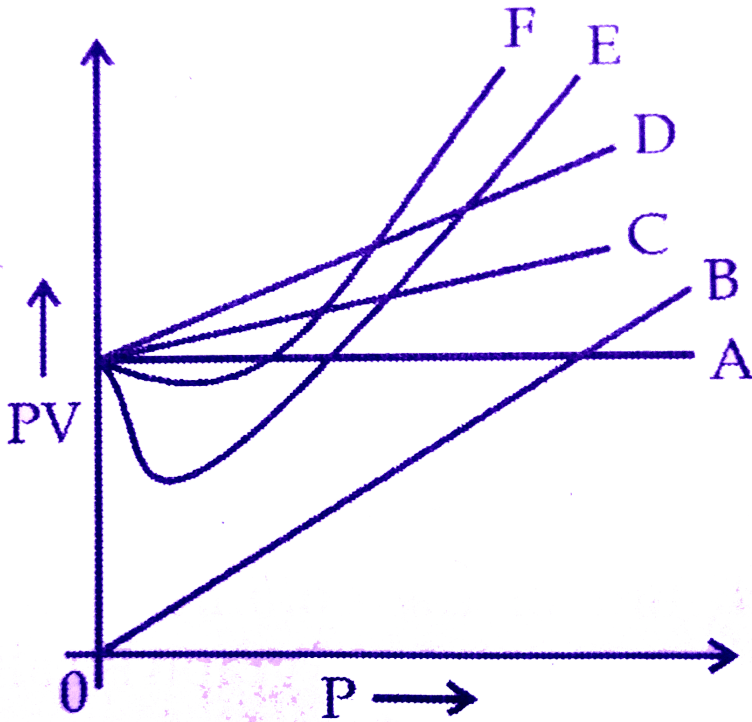C. All gases obey charles 'law at very low pressure and high

   temperature

D. pressure remaining constant volume of a gas at is directlu

   proportional to its absolute temperature

Answer: B

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32. Which curve (in figure) represents the curve of ideal gas ?

A. B only

B. C and D

C. E and F

D. A and B

Answer: A

33. Match the column I with column II and mark the appropriatre choice.

Column I	Column II
(A) $P = p_1 + p_2 + p_3 + ...$	(i) Boyle's law
(B) $P_1V_1 = P_2V_2 = P_3V_3 = ...$	(ii) Ideal gas equation
	(iii) Dalton's law of
(C) $(V - b)\left(P + \dfrac{a}{V^2}\right) = RT$	partial pressure
	(iv) Equation for real gases
(D) $PV = nRT$	

A. (A) $\rightarrow$ (i), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (iv) , (D) $\rightarrow$ (iii)

B. (A) $\rightarrow$ (iii), (B) $\rightarrow$ (i), (C) $\rightarrow$ (iv) , (D) $\rightarrow$ (ii)

C. (A) $\rightarrow$ (ii), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (i) , (D) $\rightarrow$ (iv)

D. (A) $\rightarrow$ (iv), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (iii) , (D) $\rightarrow$ (i)

Answer: B

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34. The molecules of a gas are in constant (i) _____ motion . They move in (ii) _____ lines until they collide with another molecule . The collisions are perfectly (iii) _____ in nature . A real gas behaves as an ideal gas at (iv) _____ temperature and (v) _____ pressure .

    A. random vertical straight high low

    B. straight random elastic low high

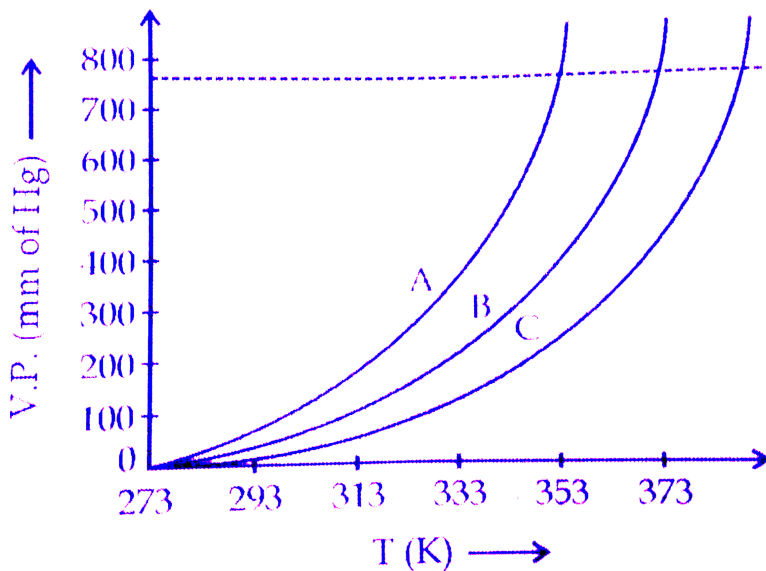   C. random straight elastic high low

    D. ideal round elastic low high

Answer: C

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35. A graph between vapour pressure and temperature of few liquids is given below. Study the graph and answer the following question.

Which of the following statements is not true ?

A. Boiling point of a liquid is the temperature at which its vapour pressure becomes equal to atmospheric pressure

B. Boiling point of water can be increased by increasing the pressure above the atmospheric pressure

C. If liquid B is heated in a closed vessel it will boil at 353 K

D. Liquid C has higher boiling point then B due to higher intermolecular forces

Answer: C

36. Assertion : At high altitudes liquids boil at lower temperaturers in comparison to that of sea level.

Reason : At high altitudes atmospheric pressure is low

A. Both assertion and reason are true and reason is the correct explanation of assertion

B. Both assertion and reason are true and reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assertion and reason are false

Answer: A

37. Assertion : Viscosity of liquids decreases as the temperature rises.

Reason : At high temperature molecules have high kinetic energy and can overcome the intermolecular forces to flow faster.

A. Both assertion and reason are true and reason is the correct explanation of assertion

B. Both assertion and reason are true and reason is not the correct explanation of assertion

C. Assertion is true but reason is false

D. Both assertion and reason are false

Answer: A

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38. A graph is plotted between pressure and volume at different temperature. On the basis of the graph what changes will you observe in the volume if

(i) the pressure is increased at constant temperature

(ii) the temperature is decreased at constant pressure
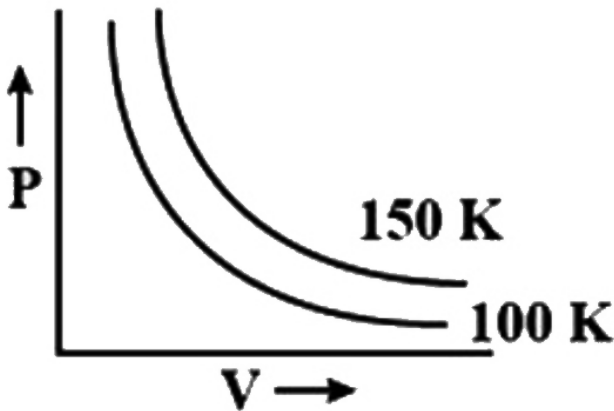
A. volume increases in both the cases

B. volume decreases in both the cases

C. volume increases in (i) and decreases in (ii)

D. volume decreases in (i) and increases in (ii)

Answer: B

39. Two atoms X and Y are non-polar and electrically symmetrical. What type of intermolecular forces of attraction can be developed between them?

A. Dipole -induced dipole forces

B. London forces or dispersion forces

C. Dipole -dipole forces

D. No forces of any kind

Answer: B

40. A container of 1 L capacity contains a mixture of 4 g of O_2 and 2 g H_2 at $0.^\circ C$. What will be the total pressure of the mixture ?

    A. 50.42 atm

    B. 25.21 atm

    C. 15.2 atm

    D. 12.5 atm

Answer: B

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41. Ideal gas equation is also called equation of states bacause

    A. it depends on states of matter

    B. it is a relation between four variables and describes the state of

      any gas

C. it is combination of various gas laws and any variable can be calculated

D. it is applicable to ony ideal gases under STP conditions

Answer: B

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42. If average velocity of a sample of gas molecules at 300 K is $5cms^{-1}$, what is RMS velocity of sample of gas molecules at the same temperature ? (Given , $\alpha : u : v = 1 : 1.224 : 1.127$)

A. 6.112 cm / s

B. 4.605 cm /s

C. 4.085 cm /s

D. 5.430 cm/s

Answer: D

43. A gases mixture contains oxygen and nitrogen in the ratio $1:4$ by weight. Therefore, the ratio of the number of molecules is:

  A. $1:8$

  B. $3:16$

  C. $1:4$

  D. $7:32$

Answer: D

Test Your Grasp

1. Which of the following statements is not correct about the three states of matter, i.e., solid, liquids and gas?

    A. Molecules of a solid possess least kinetic energy whereas those

       of a gases possess highest kinetic energy

    B. The density of solid is highest whereas theat of gases is lowest

    C. Gases like liquids possess definite volumes

    D. Molecules of a solid possess vibratory motion

Answer: C

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2. If V_0 is the volume of a given mass of gas at $273K$ at a constant pressure then according to Charles' law, the volume at $10°C$ will be

_____.

A. $10V_0$

B. $\dfrac{1}{273}(V_0 + 10)$

C. $V_0 + \dfrac{10}{273}$

D. $\dfrac{273}{273}V_0$

Answer: D

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3. In a closed vessel of 5 litres capacity, 1 g of O_2 is heated from 300 to $600K$. Which statement is not correct ?

A. Pressure of the gas increases

B. The rate of collision increases

C. The number of moles of gas increases

D. The energy of gaseous molecules increases

Answer: C

4. Which of the following is not a correct postulate of kinetic theory of gases?

A. The molecules of a gas are continuosly moving in different directions with different velocities

B. The average kinetic energy of the gas molecules is directly proportional to the absolute temperature of the gas

C. The volume of the gas is due to hitting on the molecules on the walls of the container

D.

Answer: C

5. The most probable velocity is expressed as

A. $\dfrac{8RT}{\pi M}$

B. $\dfrac{2RT}{M}$

C. $\left(\dfrac{2RT}{M}\right)^{1/2}$

D. $\left(\dfrac{3RT}{M}\right)^{1/2}$

Answer: C

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

A. $P_{N_2} = P_{CO}$

B. $P_{CO} = 0.875 P_{N_2}$

C. $P_{CO} = 2P_{N_2}$

D. $P_{CO} = 1/2P_{N_2}$

Answer: A

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7. Triple Point

A. $0°$ C, 1 atm

B. $2°$, 4.7 atm

C. $0°$ C, 4.7 mm

D. $-2°C, 4.7mm$

Answer: C

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8. A helium atom is two times heavier than a hydrogen molecule. At $298K$, the average kinetic energy of a helium atom is

    A. two times that of a hydrogen molecule

    B. same as that of a hydrogen molecule

    C. four times that of a hydrogen molecule

    D. half that of a hydrogen molecule

Answer: B

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9. If $20cm^3$ gas at $1atm$ is expanded to $50cm^3$ at constant T, then what is the final pressure

    A. $20 \times \dfrac{1}{50}$

    B. $50 \times \dfrac{1}{20}$

    C. $1 \times \dfrac{1}{20} \times 50$

D. none of these

Answer: A

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10. A flask containing air (open to the atmosphere) is heated from 300 K to 500 K. The preccentage of air escaped to the atmosphere is

    A. A flask containing air (open to atmosphere) is heated from 300 K to 500 K. The percentage of air escaped to the atmosphere is nearly

    B. 16.6

    C. 40

    D. 60

Answer: B

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11. When the temperature is raise, the viscosity of liquid decreases, this is because,

    A. Decreased volume of the solution

    B. Increases in temperature increases the average kinetic energy of

       molecules which overcome the attractive forces between them

    C. Decreased covalent and hydrogen bond forces

    D. Increased attraction between the molecules

Answer: B

12. If the rms speed of gas molecules is $x cms^{-1}$ at a pressure of p atmospheres, then the rms speed at a pressure of $2p$ atmospheres and constant temperature will be

A. x

B. 2x

C. 4x

D. $\dfrac{x}{4}$

Answer: C

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13. Which factor is most responsible for the increase in boiling points of noble gases from He to Xe?

A. Decrease in I.E.

B. Monoatomic nature

C. Monoatomic in polarisability

D. Increases in polarisability

Answer: D

---

14. At of the following does not showexpliently the relationship between Boyle's law and Charles'law?

A. $\dfrac{P_1}{P_2} = \dfrac{T_1}{T_2}$

B. PV=K

C. $\dfrac{P_2}{P_1} = \dfrac{V_1}{V_2}$

D. $\dfrac{V_2}{V_1} = \dfrac{P_1}{P_2} \times \dfrac{T_2}{T_1}$

Answer: D

15. α, v and u represent most probable velocity, average velocity and root mean square velocity of a gas at a particular temperature.Which one of the following relationship is correct?

A. $\alpha > u > v$

B. $u > \alpha > v$

C. $v > u > \alpha$

D. $u > v > \alpha$

Answer: D

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16. Which of the following gases will have the highest RMS velocity at $25°C$?

A. Oxygen

B. Carbon dioxide

C. Sulphur dioxide

D. Carbon monoxide

Answer: D

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

A. Critical tempreature

B. Boyle temperature

C. Inversion temperature

D. Reduced temperature

Answer: B

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18. A liquid can exist only

A. Between triple point and critical temperature

B. at any temperature above the melting point

C. between melting point and critical temperature

D. between boiling and melting temperature

Answer: D

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19. With rise in temperature, viscosity of a liquid

A. increases

B. decreases

C. remains constant

D. May increases or decreases

Answer: B

---

20. The surface tension of water of $20°$ is 72.75 dyne cm^{-1}. Its value in SI system is

A. 2.275 Nm^{-1}

B. 0.7275 Nm^{-1}

C. 0.07275 Nm^{-1}

D. None of the above

Answer: C

21. 8.2 L of an ideal weight 9.0 g at 300 K and 1 atm. pressure. The molecular mass of gas is

A. 9

B. 27

C. 54

D. 81

Answer: B

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22. How many moles of He gas occupy 22.4 litres at $30°C$ and one atmospheric pressure

A. 0.9

B. 1.11

C. 0.11

D. 1

Answer: A

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

A. $\sqrt{927\,/\,27}$ times the earlier value

B. same as before

C. halved

D. doubled

Answer: D

24. There is 10 litre of a gas at STP Which of the following new conditions keep the volume constant?

    A. 273 K and 2 atm. Pressure

    B. $273°$ C and 2 atm. Pressure

    C. $546°$ C and 0.5 atm pressure

    D. $0°$ C and 0.0 atm. Pressure

Answer: B

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25. According to kinetic theory of gases, for a diatomic molecule

    A. the pressure exerted by the gas is proportional to the mean velocity of the molecules

B. the pressure exerted by the gas is proportional to the root mean square velocity of the molecules

C. the root mean square velocity is inversely porportional to the temperature

D. the mean translational kinetic energy of the molecules is proportional to the absolute temperature

Answer: D

26. 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. $\dfrac{m_1}{u_1^2} = \dfrac{m_2}{u_1^2}$

B. $m_1 u_2 = m_2 u_2$

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

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

Answer: D

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27. A gas is said to behave like an ideal gas when the relation $\dfrac{pV}{T} =$ constant. When do you expect a real gas to behave like an ideal gas ?

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28. A sealed tube which can withstand a pressure of 3 atmosphere is filled with air at $27°C$ and 760 mm pressure. Find the temperature above which it will burst.

A. $900°$ C

B. $627°$ C

C. $81°$ C

D. $1173°$ C

Answer: B

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29. Four molecules of a gas have speeds of $1, 2, 3, 4cms^{-1}$ respectively.
The root mean square velocity is

A. $\sqrt{7.5}$

B. $\sqrt{30}$

C. 30

D. 0.15

Answer: A

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30. Which of the following is correct ?

    A. At altitudes the pressure of air is low

    B. At altitudes density of air is low

    C. At altitudes cooking takes place slower

    D. At altitudes water will boil at a temperature less than $100°$ C

Answer: C

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31. $1°$C rise in temperature is equal to a rise of

    A. $1°$ F

    B. $9/5°$ F

    C. $5/9°$ F

    D. $33°$ F

Answer: B

32. The mountaineers carry oxygen gas cylinders with them while climbing high mountains . Give reasons.

    A. Density of air is high at the altitudes

    B. Density of air is low at the altitudes

    C. Air is less pure at the altitudes

    D. Air contains no oxygen at the altitudes

Answer: B

33. The compressibility factor for an ideal gas is .

A. 1.5

B. 1.0

C. 2.0

D. ∞

Answer: B

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34. The critical temperature of a substance is defined as

A. The temperature above which the substance decomposes

B. the temperature above which a substance can exist only as a gas

C. Melting point of the substance

D. Boiling point of the substance

Answer: B

35. The behaviour of temporary gases like CO_2 appoaches that a permanent gases like N_2, O_2, etc. as we go

    A. below critical temperature

    B. above critical temperature

    C. above absolute zero

    D. below absolute zero

Answer: B

36. An ideal gas cannot be liquified because

    A. Its critical temperature is always above 0° C

    B. Its molecules are relatively smaller in size

C. it solidifies before becoming a liquid

D. force operative between its molecules are negligible

Answer: D

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37. The relationship between P_C, V_C and T_C is

A. $P_C V_C = RT$

B. $P_C V_C = 3RT_C$

C. $P_C V_C = \dfrac{3}{5} RT_C$

D. $P_C V_C = \dfrac{3}{8} RT_C$

Answer: D

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38. On heating a liquid its surface tension

A. increases

B. decreases

C. remans same

D. Is reduced to zero

Answer: B

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39. At what temperature will both the Celsius and Fahrenheit scales read the same value?

A. $0°$ C

B. $32°$ F

C. $-40°$ C

D. $40°$ C

Answer: C

40. Which of the following statements is correct about a liquid at constant temperature before equilibrium is attained ?

A. Rate of evaporation (R_e) decreases with time whereas rata of condesation (R_c) increases with time

B. R_e increases with time where R_c increases with time

C. R_e remains constant whereas R_c increases with time

D. R_c remains constant whereas R_e decreases with time

Answer:

41. If a gas expands at constant temperature

A. the pressure increases

B. the K.E. of the molecules remains the same

C. the K.E. of the molecules decreases

D. the number of molecules of gas decreases

Answer: B::C

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42. The equation representing Gay - Lussac 's law is

A. $P_1 \times T_2 = P_2 \times T_1$

B. $V_1 \times T_2 = V_2 \times T_1$

C. $P_1 \times T_1 = P_2 \times T_2$

D. $P_1 \times d_2 = P_2 \times d_1$

Answer: A

---

43. The strength of dispersion forces does not increases with increases in

A. size of molecules

B. molar mass

C. no. of protons

D. no. of neutrons

Answer: D

---

44. Which of the following is applications of surface tension ?

A. Capillary action

B. Cleansing action of soap

C. Spherical shape of liquid drop

D. All of these

Answer: D

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45. Dipole moment is defined as the product of charge and the

A. distance between the charges

B. square of distantce between the charges

C. square root of distance between the charges

D. half of the distance between the charges

Answer: A

46. _____ modified Linde process such that the cooling becomes more efficient.

A. Claude

B. Joule

C. Thomson

D. Boyle

Answer: A

47. Liquds which are more volatile have _____ forces of attraction.

A. strong intramolecular

B. weak intramolecular

C. weak intermolecular

D. strong inermolecular

Answer: C

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48. Which of the following value of R is not correct ?

A. 8.314 J . K_{-1} . Mol^{-1}

B. 0.0821 L . Atm . $K^{-1}\mathrm{mol}^{-1}$

C. 1.987 cal . K^{-1} . mol^{-1}

D. 0.239 cal . K^{-1} . mol^{-1}

Answer: D

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49. SI unit of pressure is

A. Nm

B. Nm^{-1}

C. Nm_2

D. mN^{-2}

Answer: C

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50. Hydrogen bonding is a particularly strong type of ...... interaction

A. dipole - dipole

B. dipole - induced dipole

C. ion-dipole

D. ion-ion

Answer: A

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