



CHEMISTRY

BOOKS - SAI CHEMISTRY (TELUGU ENGLISH)

STATES OF MATTER

MCQ

1. Which of the following compounds has zero dipole moment?

A. 1, 4 - Dichlorobenzene

B. 1,2- Dichlorobenzene

C. 1, 3 - Dichlorobenzene

D. 1-Chloro-2-methyl benzene

Answer: a



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2. Pure silicon doped with phosphorus is

A. Amorphous

B. p-type semiconductor

C. n-type semiconductor

D. Insulator

Answer: c



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3. On the top of a mountain water boils at

A. High temperature

B. Same temperature

C. High pressure

D. Low temperature

Answer: d



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4. Which one of the following statements is wrong about liquid?

A. It has intermolecular force of attraction

B. Evaporation of liquids increases with the decrease in surface area

C. It resembles a gas near the critical temperature

D. It is an intermediate state between gaseous and solid state

Answer: b



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5. Match the following.



A. A(IV) B(III) C(I) D(II)

B. A(V) B(III) C(I) D(II)

C. A(V) B(III) C(II) D (I)

D. A(IV) B(III) C(I) D(II)

Answer: b



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6. An example of covalent solid is

A. MgO

B. Mg

C. SiC

D. CaF_2

Answer: C



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7. The ratio of rates of diffusion of gases X and Y is 1 : 5 and that of Y and Z is 1 : 6. Then ratio of rates of diffusion Z and X is

A. 1 : 30

B. 1 : 6

C. 30 : 1

D. 6 : 1

Answer: c



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8. KO_2 exhibits paramagnetic behaviour. This is due to the paramagnetic nature of



Answer: d



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9. At T(K), the ratio of kinetic energies of 4g of H_2 (g) and 8g of O_2 (g) is

A. 1 : 4

B. 4 : 1

C. 2 : 1

D. 8 : 1

Answer: d



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10. The number of octahedral and tetrahedral holes respectively present in a hexagonal close packed (hcp) crystal of 'X' atoms are

A. X, 2X

B. X,X

C. 2X, X

D. 2X,2X

Answer: a



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11. How many comers of SiO_4 units are shared in the formation of three dimensional silicates?

A. 3

B. 2

C. 4

D. 1

Answer: c



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12. Which one of the following equations represents the variation of viscosity coefficient (η) with temperature (T)?

A. $\eta = Ae^{-\frac{E}{R}T}$

B. $\eta = Ae^{\frac{E}{R}T}$

C. $\eta = Ae^{-\frac{E}{K}T}$

D. $\eta = Ae^{-\frac{E}{T}}$

Answer: b



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13. The weight in grams of a non-volatile solute (mol.wt.60) to be dissolved in 90g of water to produce a relative lowering of vapour pressure of 0.02 is

A. 4

B. 8

C. 6

D. 10

Answer: c



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14. Which one of the following elements, when present as an impurity in silicon makes it a p-type semiconductor?

A. As

B. P

C. In

D. Sb

Answer: c



15. The number of unit cells present in 39g of potassium if it crystallizes as body centred cube is (N = Avogadro number, At. wt. of potassium = 39)

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

B. $\frac{N}{2}$

C. y^N

D. N

Answer: b



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16. Under which one of the following conditions do real gases approach the ideal gas behaviour?

- A. Low temperature and high pressure
- B. High temperature and high pressure
- C. High temperature and low pressure
- D. Low temperature and low pressure

Answer: c



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17. Assertion (A): White tin is an example of tetragonal system.

Reasoning (R): For a tetragonal system $a = b = c$ and $\alpha = \beta = \gamma = 90^\circ$.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is not true

D. (A) is not true but (R) is true

Answer: c



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18. The ratio of anion radius to cation radius of a crystal is 10:9.3. The coordination number of the cation in the crystal is

A. 2

B. 4

C. 6

D. 8

Answer: d



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19. The average kinetic energy of one molecule of an ideal gas at 27°C and 1 atm pressure is

A. $900 \text{ cal K}^{-1} \text{ mol}^{-1}$

B. $6.21 \times 10^2 \text{ J K}^{-1} \text{ molecule}^{-1}$

C. $336.7 \text{ J K}^{-1} \text{ molecule}^{-1}$

D. $3741.3 \text{ J K}^{-1} \text{ mol}^{-1}$

Answer: b



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20. The cubic unit cell of a metal (molar mass = 63.55 g mol^{-1}) has an edge length of 362 pm.

Its density is 8.92 g cm^{-3} . The type of unit cell is

- A. Primitive
- B. Face centred
- C. Body centred
- D. End centred

Answer: b



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21. For a crystal, the angle of diffraction (2θ) is 90° and the second order line has a d value of 2.28 \AA . The wavelength (in \AA) of X-rays used for Bragg's diffraction is

A. 1.612

B. 2

C. 2.28

D. 4

Answer: a



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22. A5 is an ionic solid. The ionic radii of A⁺ and B are respectively r and r_0 . Lattice energy of AB is proportional to

A. $\frac{r_c}{r_a}$

B. $(r_{fl} + r_0)$

C. $\frac{r_n}{r_c}$

D. $\frac{1}{r_c + r_a}$

Answer: d





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23. What is the crystal structure of cesium chloride ?

A. Body centred cubic

B. Face centred cubic

C. Tetrahedral

D. Octahedral

Answer: a



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24. The metal which is not ferromagnetic is

A. Iron

B. Manganese

C. Cobalt

D. Nickel

Answer: b



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25. The coordination number of the ions in the CsCl crystal lattice is

A. 4 : 4

B. 8 : 8

C. 6 : 6

D. 4 : 8

Answer: b



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26. What is the temperature at which the kinetic energy of 0.3 moles of helium is equal to the kinetic energy of 0.4 moles of argon at 400 K. ?

A. 400 K

B. 873 K

C. 533 K

D. 300 K

Answer: c



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27. A certain mass of a gas occupies a column of 2L at STP. To what temperature the gas must be heated to double its volume, keeping the pressure constant ?

A. 100 K

B. 273 K

C. 273°C

D. 546°C

Answer: c



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28. The volume -temperature graphs of a given mass of an ideal gas at constant pressures are shown below. What is the correct order of pressures ?



A. $P_1 > P_3 > P_2$

B. $P_1 > P_2 > P_3$

C. $P_2 > P_3 > P_1$

D. $P_2 > P_1 > P_3$

Answer: a



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29. A and B are ideal gases. The molecular weights of A and B are in the ratio of 1:4. The pressure of a gas mixture containing equal weights of A and B is P atm. What is the partial pressure (in atm) of B in the mixture?

A. $\frac{P}{5}$

B. $\frac{P}{2}$

C. $\frac{P}{2.5}$

D. $3\frac{P}{4}$

Answer: a



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30. At 27°C , 500 mL of helium diffuses in 30 min. What is the time (in hours) taken for 1000

mL of SO_2 to diffuse under same experimental conditions ?

A. 240

B. 3

C. 2

D. 4

Answer: d



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31. Assertion (A): At 300 K, kinetic energy of 16g of methane is equal to the kinetic energy of 32 g of oxygen.

Reason (R) : At constant temperature, kinetic energy of one mole of all gases is equal. The correct answer is

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

C. (A) is true but (R) is not true

D. (A) is not true but (R) is true

Answer: a



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32. If a gas contains only three molecules that move with velocities of 100, 200, 500 ms^{-1} .

What is the rms velocity of that gas in ms^{-1} ?

A. $\frac{100}{y}$

B. $\frac{100}{30}$

C. $\frac{100}{I}0$

D. $\frac{800}{3}$

Answer: c



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33. 4 g of an ideal gas occupies 5.6035 L of volume at 546 K and 2 atm pressure. What is its molecular weight ?

A. 4

B. 16

C. 32

D. 64

Answer: b



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34. At 27° C, a closed vessel contains a mixture of equal weights of helium (mol. wt. = 4), methane (mol. wt. = 16) and sulphur dioxide

(mol. wt = 64). The pressure exerted by the mixture is 210 mm. If the partial pressures of helium, methane and sulphur dioxide are P_1 , P_2 and P_3 respectively, which one of the following is correct ?

A. $P_3 > P_2 > P_1$

B. $P_1 > P_2 > P_3$

C. $P_1 > P_3 > P_2$

D. $P_2 > P_3 > P_1$

Answer: b



35. The rms velocity of CO_2 at a temperature, T (in kelvin) is $x \text{ eras}^1$. At what temperature (in kelvin), the rms velocity of nitrous oxide would be $4 \times \text{ems}^{-1}$? (Atomic weights of C, N and O are 12, 14 and 16 respectively),

A. 16 T

B. 2T

C. 4T

D. 32 T

Answer: a



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36. n moles of an ideal gas at temperature, T (in kelvin) occupy V L of volume, exerting a pressure of P atmospheres. What is the concentration (in mole / L) ?

A. P / TT

B. PT / TT

C. RT / P

D. R/PT

Answer: a



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37. The total pressure of a mixture of 604 g of O_2 and 5.6 g of N_2 present in a 2 L vessel is 1200 mm. What is the partial pressure (in mm) of nitrogen ?

A. 1200

B. 600

C. 900

D. 200

Answer: b



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38. The rms velocity of an ideal gas at 300 K is 12240 ems^{-1} , what is the most probable velocity at that temperature?

A. 10000 ems^{-1}

B. 11280 ems^{-1}

C. 13250 ems^{-1}

D. 12240 ems^{-1}

Answer: a



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39. What is the numerical value of the gas constant R- in $\text{J mol}^{-1} \text{ K}^{-1}$?

A. 0.0821

B. 803140×10^7

C. 8.314

D. 1.987

Answer: c



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40. A mixture contains 16 g of oxygen, 28 g of nitrogen and 8 g of CH_4 . Total pressure of

mixture is 740 mm. What is the partial pressure of nitrogen in mm?

A. 185

B. 370

C. 555

D. 740

Answer: a



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41. STP

A. STP

B. 0°C and 2atm

C. 273°C and 2atm

D. 273°C and 1atm

Answer: d



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42. The root mean square velocity of a gas is doubled when the temperature is

- A. Reduced to half
- B. Reduced to one-fourth
- C. Increased four times
- D. Increased two times

Answer: c



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43. At STP, the density of a gas (molecular weight 45) in g/L is

A. 2

B. 22.4

C. 11.2

D. 1000

Answer: a



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44. For an ideal gas. a plot of PV / RT versus T will look like

A. 

B. 

C. 

D. 

Answer: d



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45. Which of the following is a representation of Charles's law ?

A. $P_1T_1 = P_2T_2$

B. $P_1T_2 = P_2T_1$

C. $P_1V_1 = P_2V_2$

D. $V_1T_2 = V_2T_1$

Answer: d



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46. Equal masses of methane and oxygen are introduced into a vessel at 27°C . What fraction of the total pressure is due to oxygen.

A. $\frac{1}{10}$

B. J^1

C. j^1

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

Answer: c



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47. A given mass of a gas obeys Boyle's law at certain temperature. Which one of the plots will not give a straight line ?

A. V versus $\frac{1}{P}$

B. P versus $\frac{1}{V}$

C. $\log P$ versus $\log V$

D. P versus V

Answer: d



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48. The mole percentage of oxygen in a mixture of 7.0 g of nitrogen and 8.0 g of oxygen is

- A. 8
- B. 16
- C. 24
- D. 50

Answer: d



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49. A flask contains 3g H_2 and 24g O_2 . The partial pressure of hydrogen in the mixture is

- A. $\frac{1}{y}$ th of the total pressure
- B. $\frac{1}{y}$ th of the total pressure
- C. $\frac{1}{y}$ of the total pressure
- D. $\frac{2}{y}$ of the total pressure

Answer: d



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50. The molecular weight of a gas that diffuses twice as rapidly as a gas with molecular weight 64, is

A. 6.4

B. 8

C. 128

D. 16

Answer: d



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51. At 27°C , the ratio of root mean square velocities of ozone to oxygen is

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

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

C. $\sqrt{\frac{2}{3}}$

D. 0.25

Answer: c



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52. A sample of gas has a volume of 0.2 L, measured at 1 atm pressure and 0°C . At the same pressure but at 273°C , its volume becomes

A. 0.1 L

B. 0.4 L

C. 0.4 L

D. 0.6 L

Answer: b



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53. The rate of diffusion of a gas in a diffusion tube is $\frac{1}{2}\sqrt{7}$. Molecular weight of the gas (in g mol^{-1}) is

A. 12

B. 28

C. 24

D. 44

Answer: b





54. A gaseous mixture contains 56g of N_2 , 44g of CO_2 and 16g of CH_4 . The total pressure of the mixture is 720 mm Hg. The partial pressure of CH_4 is

- A. 180 mm
- B. 360 mm
- C. 540 mm
- D. 720 mm

Answer: a



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55. The rms velocity of an ideal gas at 27°C is $0.3\text{m} / \text{s}$. Its rms velocity at 927°C (in m / s) is

- A. 3
- B. 2.4
- C. 1.2
- D. 0.6

Answer: d



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56. The rate of diffusion of He is..... of the rate of diffusion of CH_4

A. Twice

B. Thrice

C. Same

D. Half

Answer: a



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57. If the pressure and the absolute temperature of a given mass of gas are doubled, the new volume will be.....of the initial volume.

A. Double

B. Half

C. Triple

D. Same

Answer: d



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58. The factor by which the kinetic energy of 8g of H, at 27°C is greater than the kinetic energy of 8g of O_2 at the same temperature, is

A. 4

B. 8

C. 16

D. 32

Answer: c



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