CHEMISTRY

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

STATES OF MATTER

Others

1. A 20 litre container at $400K$ contains $CO_2(g)$ at pressure $0.4atm$ and an excess of

SrO (neglect the volume of solid SrO). The volume of the container, when pressure of CO_2 attains its maximum value, will be:

(Given that: $SrCO_3(s) \Leftrightarrow SrO(s) + CO_2(g) K_p = 1.6atm$)

A. 5 L

B. 10 L

C. 4 L

D. 2 L

Answer: A

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2. Wich is the incorrect statement?

A. $FeO_{0.98}$ has non-stoichiometric metal deficiency defect

B. Density decreases in case of crystals with Sschottky's defect

C. $NaCl(S)$ is insulator, silicon is semiconductor, silver is conductor, quartz is piezoelectric crystal

D. Frenkel defect is favorued in those ionic compounds in which sizes of cation and anions are almost equal

Answer: A::D

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3. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction

of the oxygen escapes in the time required for one-half of the hydrogen to escape ?

A. $1/4$

B. $3/8$

C. $1/2$

D. $1/8$

Answer: D

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4. Lithium has a bcc structure .Its density is $530kgm^{-3}$ and its atomic mass is $6.94gmol^{-1}$ .Calculate the edge length of a unit cell of lithium metal $\left(N_A = 6.02 \times 10^{23} mol^{-1}\right)$

A. 352 pm

B. 527 pm

C. 264 pm

D. 154 pm

Answer: A

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5. The ionic radii of A^+ and B^- ions are $0.98 \times 10^{-10} m$ and $1.81 \times 10^{-10} m$.The coordination number of each ion in AB is :

A. 4

B. 8

C. 2

D. 6

Answer: D

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6. In calcium, fluoride having the florite structures. The coordination number for calcium ion $\left(Ca^{2+}\right)$ and fluoride ion $\left(F^{-}\right)$ are

A. 4 and 2

B. 6 and 6

C. 8 and 4

D. 4 and 8

Answer: C

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7. Which of the following statements regarding defects in crystalline solids is correct?

A. Schottky defects have no effect on the density of crystalline solides

B. Frenkel defects decreases the density of crystalline solides

C. Frenkel defects is a dislocation defect

D. Frenkel defect is found in halides of alkaline metals

Answer: C

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8. The vacant space in bcc lattice unit cell is

A. $26\ \%$

B. $48\ \%$

C. $23\ \%$

D. $32\ \%$

Answer: D

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9. A given metal crystalline out with a cubic structure having edge length of 361 pm .if there are four metal atoms in one unit cell, what is the radius of metal atom?

A. 40 pm

B. 127 pm

C. 80 pm

D. 108 pm

Answer: B

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10. A mixture of gases contains H_2 and O_2 gases in the ratio of $1:4(w/w)$. What is the molar ratio of the two gases in the mixture?

A. $1:4$

B. $4:1$

C. $16:1$

D. $2:1$

Answer: B

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11. Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature $27^\circ C$ in identical conditions. The

ratio of the volume of gases $H_2 : O_2$: methane would be

A. $8:16:1$

B. $16:8:1$

C. $16:1:2$

D. $8:1:2$

Answer: C

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12. Maximum deviation from ideal gas is expected from

A. $H_2(g)$

B. $N_2(g)$

C. $CH_4(g)$

D. $NH_3(g)$

Answer: D

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13. $50mL$ of each gas A and of gas B takes 150 and 200 seconds respectively for effusing through a pin hole under the similar conditon. If molecular mass of gas B is 36, then the molecular mass of gas A will be

A. 96

B. 128

C. 32

D. 64

Answer:

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14. A gaseous mixture was prepared by taking equal moles of CO and N_2. If the total pressure of the mixture was found to be 1 atomosphere, the partical pressure of the nitrogen (N_2) in the mixture is

A. 0.8 atm

B. 0.9 atm

C. 1 atm

D. 0.5 atm

Answer: D

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

A. 12.25 u

B. 6.50 u

C. 25.00 u

D. 50.00 u

Answer: A

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

A. 2.8

B. 4

C. 1.4

D. 2.0

Answer: C

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17. Lithium forms body centred cube structure .The length of the side of its unirt cell is 351 pm Atomic radius of the lithium will be

A. 240.8 pm

B. 151.8 pm

C. 75.5 pm

D. 300.5 pm

Answer: B

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18. Copper crystallises in fcc with a unit cell length of 361 pm. What is the radius of copper atom?

A. 128 pm

B. 157 pm

C. 181 pm

D. 108 pm

Answer: A

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19. With Which one of the following elements silicon should be doped so as to give p-type of semiconductor?

A. Germanium

B. Arsenic

C. Selenium

D. Boron

Answer: D

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20. Percentage of free space in cubic in a body-centred cubic unit cell is .

A. $30\ \%$

B. $32\ \%$

C. $34\ \%$

D. $28\ \%$

Answer: B

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21. If $'a'$ stands for the edge length of the cubic systems: simple cubic,body centred cubic and face centred cubic then the ratio of radii

of the spheres inthese systems will be respectively,

A. $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$

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

C. $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a$

D. $1a : \sqrt{3}a : \sqrt{2}a$

Answer: A

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22. Which one of the following statements is an incorrect?

A. The fraction of the total volume occupied by the atoms in a primitive cell is 0.48

B. Molecular solids are generally volatile

C. The number of carbon atoms in an unit cell of diamond is 4

D. The number of Bravais lattices in which a crystal can be categorised is 14

Answer: A

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

A. kinetic energy of molecules decreases

B. pressure of the gas increases

C. kinetic energy of molecules remains the same

D. number of the molecules of gas increases

Answer: C

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24. If $NaCl$ is doped with $10^{-4} mol\,\%$ of $SrCl_2$ the concentration of cation vacancies will be $\left(N_A = 6.02 \times 10^{23} mol^{-1}\right)$

A. $6.023 \times 10^{15} \mathrm{mol}^{-1}$

B. $6.023 \times 10^{16} \mathrm{mol}^{-1}$

C. $6.023 \times 10^{17} \mathrm{mol}^{-1}$

D. $6.023 \times 10^{14} \mathrm{mol}^{-1}$

Answer: C

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25. The fraction of total volume occupied by atoms in a simple cube is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3\sqrt{2}}$

C. $\frac{\pi}{4\sqrt{2}}$

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

Answer: A

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26. The appearance of colour in solid alkali metal halides is generally due to

A. F-centres

B. Schottky defect

C. Frenkel defect

D. Interstitial positions

Answer: A

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27. $CsBr$ crystallises in a body $-$ centred cubic lattice. The unit cell length is $436.6pm$. Given that : the atomic mass of $Cs = 133$

and that of $Br = 80amu$ and Avogadro's number being $6.02 \times 10^{23} mol^{-1}$, the density of $CsBr$ is :

A. $42.5g/cm^3$

B. $0.425g/cm^3$

C. $8.25g/cm^3$

D. $4.25g/cm^3$

Answer: D

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28. In a face centred cubic lattice unit cell is shared equally by how many unit cells?

A. 8

B. 4

C. 2

D. 6

Answer: D

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

A. H_2O

B. C_6H_6

C. CH_3OH

D. C_2H_5OH

Answer: A

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30. A compound formed by elements X and Y crystallises in a cubic structure in which the X atoms are at the corners of a cube and the Y atoms are at the face centres.The formula of the compound is

A. XY_3

B. X_3Y

C. XY

D. XY_2

Answer: A

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31. The pyknometric density of sodium chloride crystal is $2.165 \times 10^3 kgm^{-3}$ while its X ray density is $2.178 \times 10^3 kgm^{-3}$ the fraction of unoccupied sites in $NaCl$ crystal is

A. 5.96×10^{-1}

B. 5.96×10^{-3}

C. 5.96

D. 5.96×10^{-2}

Answer: B

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

A. High temperature, low pressure

B. Low temperature, high pressure

C. High temperature, high pressure

D. Low temperature, low pressure

Answer: A

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33. Zn converts from its melted state to its soilds state, it has hcp structure ,thenfind out the number of nearest atoms.

A. 6

B. 8

C. 12

D. 4

Answer: C

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

A. boiling point increases with increasing pressure

B. boiling point decreases with increasing pressure

C. extra pressure of pressure cooker, softens the beans

D. internal energy is not lost while cooking in presssure cooker.

Answer: B

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35. A compound formed by elements A and B crystallises in a cubic structure where A atoms are present at the corners of a cube and the B

atoms are present at the face centres.The formula of the compound is

A. A_2B_2

B. AB_3

C. AB

D. A_3B

Answer: B

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36. Which of the following expressions correctly represents the relationship between the average molar kinetic energies (KE) of CO and N_2 molecules at the same temperature?

A. $\overline{KE}_{CO} < \overline{KE}_{N_2}$

B. $\overline{KE}_{CO} > \overline{KE}_{N_2}$

C. $\overline{KE}_{CO} = \overline{KE}_{N_2}$

D. Cannot be predicted unless volumes of the gases are given

Answer: C

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

A. Gases do not gave a definite shape and volume

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

C. Confined gas exerts uniform pressure on the walls of its container in all directions

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

Answer: D

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38. 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. 2 mL

C. 10 mL

D. 20 mL

Answer: A

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39. The second order Bragg diffraction of X-rays with $\lambda = 1.0\text{Å}$ from a set of parallel planes in a metal occurs at an angle 60°. The distance between the scattering planes in the crystals is

A. 0.575Å

B. 1.00Å

C. 2.00Å

D. 1.17Å

Answer: D

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40. The edge length of a face-centred cubic unit cell is $508 \pm$. If the radius of the cation is $110 \pm$ the radius of the anion is

A. 288 pm

B. 398 pm

C. 144 pm

D. 618 pm

Answer: C

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41. Schottky defect in a crystal is observed when

A. an ion leaves its normal site and occupies an interstitial site

B. unequal number of cations and anions are missing from the lattice

C. density of the crystal is increased

D. equal number of cations and anions are missing from the lattice

Answer: D

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42. The intermetallic compounds $LiAg$ crystallises in cubic lattice in which both lithium and silver have coordination number of eight ,the crystal class is

A. simple cube

B. body centred cube

C. face centred cube

D. None of the above

Answer: B

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43. The edge length of a face-centred cubic unit cell is $508 \pm$. If the radius of the cation is $110 \pm$ the radius of the anion is

A. 288 pm

B. 398 pm

C. 154 pm

D. 618 pm

Answer: C

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44. 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 3 atm

B. 550 K and 1 atm

C. 250 K and 4 atm

D. 450 K and 2 atm

Answer: B

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45. Oxygen and cyclopropane at partial pressures orf 570 torr and 170 torr respectively are mixed in a gas cylinder. What is the ratio of the number of moles of cyclopropane to the number of moles of oxygen?

A. $\frac{170 \times 42}{570 \times 32} = 0.39$

B. $\frac{170}{24} / \left(\frac{170}{42} + \frac{570}{32} \right) \approx 0.19$

C. $\frac{170}{740} = 0.23$

D. $\frac{170}{570} = 0.30$

Answer: D

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46. 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

Answer: A

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47. 500 mL of nitrogen at $27^\circ C$ is cooled to $-5^\circ C$ 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

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

A. $\sqrt{\frac{927}{27}}$ times of the earlier value

B. same as before

C. halved

D. doubled

Answer: D

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50. A solid with high electrical and thermal conductivity from the following is

A. Si

B. Li

C. NaCl

D. ice

Answer: B

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51. When electrons are trapped into the crystalline anion vacancy the defect is known as

A. Schottky defect

B. Stoichiometric defect

C. Frenkel defect

D. F-centres

Answer: D

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52. A pure crystalline substance on being heated gradually first forms a trubid liquid at constant temperature and still at higher

temperature turbidity disappears. The behavious is a characteristic of substance forming

A. allotropic crystals

B. liquid crystals

C. isomeric crystals

D. isomorphous crystals

Answer: B

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53. On doping Ge with a little of In or Ga one gets

A. p-type semiconductor

B. insultor

C. n-type semiconductor

D. rectifier

Answer: A

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54. In the fluorite structure the coordination number of Ca^{2+} ion is

A. 4

B. 6

C. 8

D. 3

Answer: C

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55. The number of atoms contained in one face -centred cubic unit cell of monoatomic substance is :

A. 1

B. 2

C. 4

D. 6

Answer: C

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56. 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

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57. 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. $\sqrt{2}:\sqrt{3}:\sqrt{\frac{8}{\pi}}$

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

Answer: D

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58. For an ideal gas, pressure (p) and interal energy (E) per unit volume are related as

A. $p = \frac{2}{3}E$

B. $p = \frac{3}{2}E$

C. $p = \frac{1}{2}E$

D. $p = 2E$

Answer: A

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59. Under what conditions will a pure sample of an ideal gas not only exhibit a pressure of $1atm$ but also a concentration of $1mollitre^{-1}$ $[R = 0.082$ 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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60. 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 V

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

Answer: C

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61. An ideal gas can never be liquefied because

.

A. its critical temperature is always above $0^\circ C$

B. its molecules are relatively smaller in size

C. it solidifies before becoming a liquid

D. forces operating between its molecules are negligible

Answer: D

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62. Value of gas constant R is .

A. $0.082 \quad \mathrm{L\ atm\ K}$

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

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

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

Answer: B

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63. Which is not true in case of an ideal gas?

A. It cannot be converted into a liquid

B. There is no interaction between the molecules

C. All molecules of the gas move with same speed

D. At a given temperature, pV is proportional to the amount of the gas

Answer: C

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64. A closed flask contains water in all its three states solid, liquid and vapour at $0^{\circ}C$. 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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65. For orthorhombic system axial ratios are $a \neq b \neq c$ and the axial angle are

A. $\alpha = \beta = \gamma \neq 90^\circ$

B. $\alpha = \beta = \gamma = 90^\circ$

C. $\alpha = \gamma = 90^\circ, \beta \neq 90^\circ$

D. $\alpha \neq \beta \neq \gamma \neq 90^\circ$

Answer: B

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66. Most crystals show good cleavage because their atoms ions or molecules are

A. weakly bonded together

B. strongly bonded together

C. spherically symmetrical

D. arranged in planes

Answer: D

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67. 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. $HBr < O_2 < H_2 < N_2$

Answer: B

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68. For the given ideal gas equation $PV = nRT$, answer the following questions:

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 remains constant

Answer: D

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69. 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

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70. 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 is high and pressure is low

Answer: D

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71. In van der Waal's equation of state for a non ideal gas the term that accounts for i9ntermolecular forces is:

A. $(V - b)$

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

C. $\left(p + \frac{a}{V^2}\right)$

D. RT

Answer: C

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72. Absolute zero is defined as the temperture

A. at which all molecular motion ceases

B. at which liquid helium boils

C. at which ether boils

D. All of the above

Answer: A

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73. 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

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74. The ability of a substance to exist in two or more crstaline forms knows as:

A. isomerism

B. polymorphism

C. isomorphism

D. amorphism

Answer: B

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75. Correct gas equation is :

A. $\frac{V_1T_2}{p_1} = \frac{V_2T_1}{p_2}$

B. $\frac{p_1T_1}{V_1} = \frac{p_2V_2}{T_2}$

C. $\frac{p_1V_1}{p_2V_2} = \frac{T_1}{T_2}$

D. $\frac{V_1V_2}{T_1T_2} = p_1p_2$

Answer: C

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76. Pressure remaining the constant, the volume of a given mass of an ideal gas increases for every degree centigrade rise in temperature by definite fraction of its volume at:

A. $0^\circ C$

B. `absolute zero

C. its critical temperature

D. its Boyle's temperature

Answer: A

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77. If P, V, M, T and R are symbols of pressure, volume, molecular weight, temperature and Gas contstant, what is the equation of density of ideal gas

A. $\frac{RT}{pM}$

B. $\frac{p}{RT}$

C. $\frac{M}{V}$

D. $\frac{pM}{RT}$

Answer: D

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