CHEMISTRY

BOOKS - MODERN PUBLICATION CHEMISTRY (KANNADA ENGLISH)

UNIT TEST 1

Select The Correct Answer

1. A gaseous mixture contains H_2 and N_2 in the ratio of $1:4$ by weight . The ratio of their

molecules is :

A. $7:2$

B. $1:8$

C. $2:7$

D. $1:4$

Answer: A

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2. The number of significant figures in the final answer of :

$$\frac{(16.8-14.2)\left(6.023\times10^{23}\right)}{2.76}$$ is :

A. 2

B. 3

C. 1

D. 4

Answer: A

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3. For a given mass of a gas , if pressure is reduced to half and its temperature is doubled, then volume V will become :

A. 4V

B. $2V^2$

C. $V/4$

D. 8V

Answer: A

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4. A real gas obeying van der Waals' equation : $\left(P+\frac{an^2}{V^2}\right)(V-b)=nRT$ will closely resemble an ideal gas if

A. the constants a and b are large

B. a and b are both small

C. a is large and b is small

D. a is small and b is large

Answer: B

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5. Which of the following relates to light as wave motion as well as a stream of particles?

A. photoelectric effect

B. $E = mc^2$

C. $E = hv$

D. diffraction

Answer: C

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6. How many electrons in an atom with atomic number 104 can have $(n+1)=8$?

A. 24

B. 2

C. 4

D. 16

Answer: D

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7. A molecule MX_3 has no dipole moment. The sigma bonding orbital used by M (atomic no < 21) is :

A. pure p

B. sp hybrid

C. sp^2 hybrid

D. sp^3 hybrid

Answer: C

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8. 1 mole of ammonia contains :

A. 6.02×10^{23} atoms of H

B. 3 gram atoms of hydrogen

C. 4g of nitrogen

D. 6.02×10^{23} atoms of N and 6.02×10^{23} atoms of hydrogen

Answer: B

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9. The root mean square velocity of SO_2 gas becomes the same as that of methane at $27^\circ C$ when the temperature is :

A. $327^\circ C$

B. $127^\circ C$

C. $54^\circ C$

D. $927^\circ C$

Answer: D

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10. 56g of gaseous nitrogen and 64g of gaseous sulphur dioxide are mixed together in a 6L vessel. If the total pressure of the mixture is 3 atm, what will be the partial pressure of nitrogen in the mixture ?

A. 3 atm

B. 1 atm

C. 1.5 atm

D. 2 atm

Answer: D

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11. The values of van der Waals' constant 'a' for the gases O_2. N_2, NH_3 and CH_4 are 1.360, 1.390 , 4.170 and 2.52 L^2 atm mol^{-2} respectively . The gas which can most easily be liquified is :

A. O_2

B. N_2

C. NH_3

D. CH_4

Answer: C

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12. The vapour density of a gas is 35.5 . The volume occupied by 3.55g of the gas at N.T.P. is :

A. 1.12L

B. 11.2L

C. 22.4L

D. 44.8L

Answer: A

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13. The average kinetic energy of the molecules of SO_2 at $27^\circ C$ is E. The average kinetic energy of CO_2 at $27^\circ C$ is :

A. $64x / 44$

B. $44x / 64$

C. x

D. $\sqrt{300x}$

Answer: C

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14. The correct set of quantum numbers for the valence electrons of rubidium atom (Z=37) is

A. $5,0,0,+1/2$

B. $5,1,+1/2$

C. $5,1,1,-1/2$

D. $6,0,0,-1/2$

Answer: A

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15. The kinetic energy of the photoelectrons depends upon:

A. intensity of radiation

B. frequency of radiation

C. the intensity and frequency of radiation

D. none of these

Answer: B

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16. The wavelength of the first line of Balmer series of H-atom of 6561Å. The wavelength of the second line of the series is

A. 13122Å

B. 3280Å

C. 4860Å

D. 2180Å

Answer: C

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17. Which of the following has maximum magnetic moment?

A. $Ni^{2+}(Z = 28)$

B. $Se^{2-}(Z = 34)$

C. Mn^{2+} (Z = 25)

D. Fe^{2+} (Z = 26)

Answer: C

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18. The ratio of radii of the first three Bohr orbits of H-atom is :

A. $1:2:3$

B. $1:4:9$

C. $1:9:27$

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

Answer: B

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19. The ratio of difference in energy between the first and second Bohr orbits to that of second and third Bohr orbits is

A. $1/2$

B. $1/3$

C. $4/9$

D. $27/5$

Answer: D

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20. Among the following particles, which will have the shortest wavelength when accelerated by one million eV?

A. neutron

B. tritium atom

C. $\alpha -$ particle

D. electron

Answer: C

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21. Which of the following sets of quantum number is correct for an electron in 4f orbital?

A. n=4,l =3,m =4,s = $+1/2$

B. n=4,l=4,m=0,s = $-1/2$

C. n=4,l=2,m=-2,s $+1/2$

D. n=4,l=3,m=-2,s=$-1/2$

Answer: D

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22. The total number of spectral lines obtained in Lyman series when an electron drops from 6th level is :

A. 10

B. 15

C. 20

D. 6

Answer: B

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23. Atoms may be regarded as comprising protons, neutrons and electrons. If the mass of a neutron were halved and that of electron

was doubled , the atomic mass of ${}_6C^{12}$ would :

A. remain approximately the same

B. be approximately doubled

C. be approximately halved

D. be reduced approximately by 25%

Answer: D

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24. Which of the following statements regarding spectral series is correct ?

A. The lines in Balmer series correspond to electron transitions from energy levels higher than n =1 energy level

B. Paschen series appears in infra -red region

C. The lines of Lyman series appear in visible region

D. Transitions from higher energy levels to 4th energy level produce Pfund series which fall in infra-red region

Answer: B

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25. As the atomic number of the halogens increases, the halogens :

A. lose their outermost electrons less readily

B. become light dense

C. become light in colour

D. gain electrons less readily

Answer: D

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26. Which of the following has largest size ?

A. O^{2-}

B. F^{-}

C. Na^{+}

D. S^{2-}

Answer: D

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27. Which of the following electronic configuration would you expect to have the highest second ionization enthalpy :

A. $1s^2 2s^2 2p^6 3s^2$

B. $1s^2 2s^2 2p^6 3s^1$

C. $1s^2 2s^2 2p^6 3s^2 3p^4$

D. $1s^2 2s^2 2p^6 3s^2 3p^5$

Answer: B

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28. The negative electron gain enthalpy values of halogens follows the order:

A. $F > Cl > Br > I$

B. $I > Br > Cl > F$

C. $Cl > Br > I > F$

D. $Cl > F > Br > I$

Answer: D

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29. Which of the following does not involve sp^3 hybridisation of the central atom ?

A. SiH_4

B. NH_3

C. SF_4

D. H_2O

Answer: C

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30. The geometry of NF_5 molecule is :

A. Trigonal bipyramidal

B. Square planar

C. Tetrahedral

D. None of these

Answer: D

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31. Which of the following species does not exist ?

A. $[SnCl_6]^{2-}$

B. $[GeCl_6]^{2-}$

C. $[Al(OH)_6]^{3-}$

D. $[CCl_6]^{2-}$

Answer: D

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32. Which of the following has largest ONO bond ?

A. NO_2

B. NO_2^+

C. NO_2^-

D. NO_3^-

Answer: B

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33. XeF_2 molecule is :

A. Linear

B. V-shaped

C. Triangular planar

D. Tetrahedral

Answer: A

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34. Which of the following has least hydrogen bonding ?

A. Phenol

B. Liquid NH_3

C. Liquid HCl

D. Liquid HF

Answer: C

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35. Which of the following is paramagnetic ?

A. B_2

B. F_2

C. O_2^{2-}

D. N_2

Answer: A

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36. Which of the following has lowest boiling point ?

A. HF

B. HCl

C. HBr

D. H_2O

Answer: B

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37. The molecule having highest bond dissociation energy is :

A. O_2

B. O_2^+

C. O_2^-

D. O_2^{2-}

Answer: B

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38. Intermolecular forces in solid hydrogen are

:

A. Covalent

B. Ionic

C. van der Waals'

D. Hydeogen bonds

Answer: C

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39. Which of the following is least ionic ?

A. NaCl

B. AgCl

C. $BaCl_2$

D. CsCl

Answer: B

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40. What weight of CO_2 will contain same number of oxygen atoms as are present in 3.6 g of water ?

A. 8.8g

B. 7.2g

C. 4.4g

D. 220g

Answer: C

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41. The root mean square velocity of one mole of a monatomic gas having molar M is $\mu_{\text{r.m.s.}}$ .The relation between the average kinetic energy (E) of the gas and $\mu_{\text{r.m.s.}}$ is :

A. $\mu_{\text{r.m.s.}} = \sqrt{\frac{3E}{2M}}$

B. $\mu_{\text{r.m.s.}} = \sqrt{\frac{2E}{3M}}$

C. $\mu_{\text{r.m.s.}} = \sqrt{\frac{2E}{M}}$

D. $\mu_{\text{r.m.s.}} = \sqrt{\frac{E}{3M}}$

Answer: C

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42. What volume of 10M HCl and 3M HCl should be mixed to get 1L of 6M HCl solution ?

A. 428ml, 572ml

B. 500ml, 500ml

C. 572ml, 428ml

D. 492ml,508ml

Answer: A

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43. A tennis ball travels at a speed of 96 miles per hour. The speed of the ball in metres per second is :

A. $9.6ms^{-1}$

B. $58.6ms^{-1}$

C. $29.3ms^{-1}$

D. $42.7ms^{-1}$

Answer: D

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44. The simplest formula of a compound containing 21.9% Mg, 27.8% P and 50.3% O by mass is :

A. MgP_2O_4

B. $Mg_2P_2O_7$

C. Mg_3P_4

D. $Mg_2P_3O_5$

Answer: B

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45. The temperature at which most probable speed of CO molecules is twice that at $27^\circ C$ is :

A. $108^\circ C$

B. 108K

C. $927^\circ C$

D. $1200^\circ C$

Answer: C

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46. The hybridisation and geometry of ClO_3^- is :

A. sp^2, trigonal planar

B. sp^3, tetrahedral

C. sp^3d^2, pyramidal

D. sp^3, pyramidal

Answer: D

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47. Which of the following statement is not correct?

A. N_2^+ and O_2^+ have same bond order

B. CO^+ has larger bond length than CO

C. O_2^- has weaker bond than O_2

D. B_2 molecule is paramagnetic

Answer: B

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48. The shape of XeF_5^+ is :

A. Trigonal bipyramidal

B. Square pyramidal

C. Pentagonal

D. Distorted pentagonal bipyramidal

Answer: B

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49. The molecule ClF_3 has same number of lone pairs as are present in :

A. SF_4

B. XeF_2

C. IF_5

D. XeF_4

Answer: D

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50. The density of CO at STP is :

A. $0.625gL^{-1}$

B. $1.875gL^{-1}$

C. $1.25gL^{-1}$

D. $28gL^{-1}$

Answer: C

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51. The ratio of average speed and most probable speed is :

A. $2/\sqrt{\pi}$

B. $\sqrt{8RT}/(\pi M)$

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

D. $\pi/\sqrt{2}$

Answer: A

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52. A mixture of $NH_3(g)$ and $N_2H_4(g)$ is placed in a sealed vessel at $27^\circ C$. The total pressure of the gas is 0.5 atm. The vessel is heated to $927^\circ C$ where the following decomposition reaction take place :

$N_2H_4 \rightarrow N_2(g) + 2H_2(g)$

$2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$

The pressure in the vessel at this stage becomes 4.5 atm. The mole percent of $NH_3(g)$ in the original mixture was :

A. 0.25

B. 0.6

C. 0.75

D. 0.8

Answer: C

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53. For HCl molecule, $\mu = 1.03\text{D}$ and bond length is 1.27Å . The fraction of charge carried by Cl is :

A. -0.50

B. -0.17

C. -0.82

D. -0.42

Answer: B

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54. In which of the following pairs, the first substance is more covalent than the second ?

A. AgCl, AgI

B. KCl, LiCl

C. $MgCl_2$, $BeCl_2$

D. AgCl,NaCl

Answer: D

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55. Which of the following statement is correct ?

A. Radial wave functions depend only upon quantum number n

B. $2p_x$ and $2p_y$ have different angular wave function

C. The radial probability distribution curves for 2s,3p and 3d have 1,2 and 3 regions of maximum probability

D. The radial wave functions for 3s and 4s orbitals are same.

Answer: B

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56. The pyknometer density of NaCl crystal is $2.165 \times 10^3 kgm^{-3}$ while its X -rays density is $2.178 \times 10^3 kgm^{-3}$. The fraction of the unoccupied sites in NaCl crystal is :

A. 5.96

B. 5.96×10^{-2}

C. 0.596

D. 5.96×10^{-3}

Answer: D

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57. The energy associated and radius of first orbit of He^{+} is :

A. $-54.38eV, 0.2645\text{Å}$

B. $-54.38eV, 0.529^{-}$

C. $-13.595eV, 0.2645\text{Å}$

D. $6.795eV, 0.2645\text{Å}$

Answer: A

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58. The d-orbitals involved in sp^2d and sp^3d^2 hybridisation are respectively :

A. $d_{x^2-y^2}$ and $d_{x^2-y^2}, d_{x^2}$

B. d_{z^2} and d_{xy}, d_{yz}

C. $d_{x^2-y^2}$ and d_{xy}, d_{zx}

D. d_{x^2} and $d_{x^2-y^2}, d_{x^2}$

Answer: A

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59. 20% N_2O_4 molecules are dissociated in a sample of a gas at $27^\circ C$ and 760 torr

pressure. The density of the equilibrium mixture is :

A. $3.1gL^{-1}$

B. $6.2gL^{-1}$

C. $12.4gL^{-1}$

D. $18.0gL^{-1}$

Answer: C

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60. An organic compound on analysis gave the following composition :

C = 57.8% H = 3.6%

and rest is oxygen. Its empirical formula is :

A. $C_4H_2O_3$

B. $C_4H_3O_2$

C. $C_2H_4O_6$

D. $C_3H_4O_2$

Answer: B

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