INDIAN SCHOOL AL WADI AL KABIR

FIRST ASSESSMENT 2024-2025

CLASS XI CHEMISTRY MAX MARKS: 70

1.	(a) 88.89%	1
2.	b) Equal volumes of gases at the same temperature and pressure contain an equal number of molecules.	1
3.	b) Pauli exclusion principle	1
4.	a) Quantized	1
5.	b) Azimuthal quantum number	1
6.	c) Aufbau principle	1
7.	(b) 15, 5 and 3	1
8.	(d) The ratio of their charge and size (i.e. charge density) is nearly the same	1
9.	(a) 120^0	1
10.	(a) BF_3	1
11	(a) low ionization enthalpy and high electron affinity	1
12	(d) 4, 0	1
13.	(c) A is true but R is false	1
14	(a) Both A and R are true and R is the correct explanation of A	1
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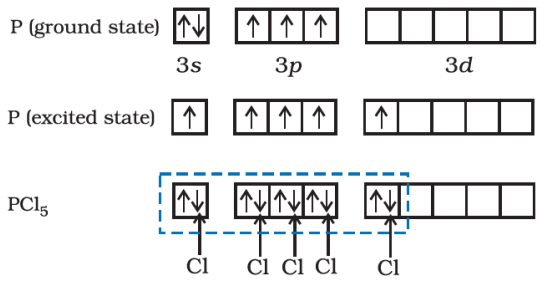
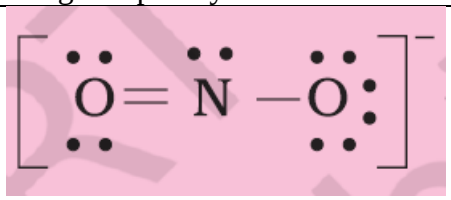
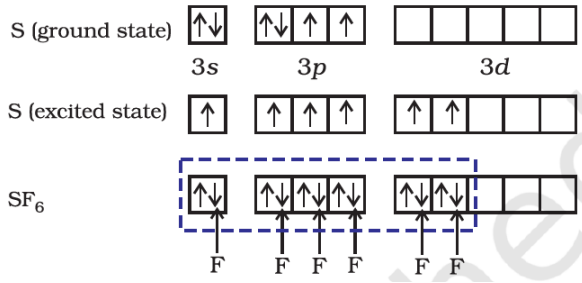
17.	(a) 2 moles, (b) C_4H_8 OR (a) Number of moles= Volume at STP/22.4 L = 0.08/22.4=0.035 moles (b) 1 mole of O_2 contains 6.022 x 10^{23} molecules 1 mole of O_2 gas at STP = 32 g	1 1 1 1
18	The Bohr model was applicable only for those atoms which have one electron The Behr's model could not explain the splitting of spectral lines in presence of a magnetic field or electric field	1 1
19.	(i) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^1 4s^2$ (ii) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$	1 1
20	(a) Atomic radii decrease along a period (b) because the atomic size increases gradually and shielding effect increases	1 1
21.	According to Valence shell electron pair repulsion theory or VSEPR theory, tetrahedral geometry. But due to lone pairs of Sulphur the shape will be bent	2
22.	Section C (a) 1/6.022 x 10^{23}=m/12 m = 12/6.022 x 10^{23} m= 2x10^{-23} g (b) Molality is the number of moles of solute per thousand grams of solvent whereas molarity is the number of moles of solute dissolved in one litre of solution. Molality is independent of temperature whereas molarity changes with change in temperature as volume changes with temperature. (Any one)	 1 1 1 1
23	the mass percentage of calcium in calcium phosphate = 120/310×100=38.71 the mass percentage of phosphorus in calcium phosphate = 62/310×100=20 And the mass percentage of oxygen in calcium phosphate = 128/310×100=41.29	1 1 1
24.	Moles of Water = 2 mol Moles of NaOH = 0.1 mol Mole fraction of water $= \frac{\text{Number of moles of } H_2O}{\text{No. of moles of water} + \text{No. of moles of NaOH}}$ $= \frac{2}{2+0.1} = \frac{2}{2.1} = 0.95$ Mole fraction of NaOH $= \frac{\text{Number of moles of NaOH}}{\text{No. of moles of NaOH} + \text{No. of moles of water}}$ $= \frac{0.1}{2+0.1} = \frac{0.1}{2.1} = 0.047$	1 1 1

	OR **(i)** for 5 mols of 'A', the moles of 'B' required = $= 5 \text{ mol of A} \times \frac{4 \text{ mol of B}}{2 \text{ mol of A}}$ $= 10 \text{ mol B}$ 'B' is the limiting reagent. Hence 6 mols of 'B' will (ii) $6 \text{ mol of B} \times \frac{3 \text{ mol of C}}{4 \text{ mol of B}} = 4.5 \text{ mol of C}$	1 1 1
25.	(a) $E_n = -2.18 \times 10^{-18} \left(\frac{Z^2}{n^2}\right) J$ = -2.18x10^{-18} x 4= -8.72x10^{-18} J (b) in the ground state of an atom or ion, electrons fill atomic orbitals of the lowest available energy level before occupying higher-energy levels. (c) 2s and 2p	(1) x3
26.	(a) due to small size of fluorine atom.there are strong interelectronic repulsions in F (b) all d- block elements which don't have completely filled d- orbitals are not counted as transition elements But the elements in which the last electron is filled in the d orbital is a d block element	1 1 1
27.	 P undergoes sp3d hybridization and has trigonal bipyramidal geometry.	2 ½ + ½
28	(a)  (b) Formal charge = 5 - 2 - (6/2) = 0	1.5 1.5
29.	(a) $2\ C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ 60 g of C_2H_6 = 2 moles	1 1

	2 moles of C_2H_6 requires 7 moles of O_2 = 7 x 22.4 = 156.8 L (b) 0.1 mole of $C_{12}H_{22}O_{11}$ contains $6.022x10^{22}$ molecules hence No of C atoms in 0.1 mole = $12 \times 6.022x10^{22} = 72.264 \times 10^{22}$ C atoms (c) $10/6.022 \times 10^{23} = m/128$ $m = 213.33X10^{-23}$ g **OR** 100 g of $CaCO_3$ = 1 mole = 1 mole of CaO = 56g of CaO	1 1 1
30	(a) Size of the Fluorine is small, effective nuclear charge increases (b) (ii) Decreases c) (iii) 14th group **OR** (c) (iii) halogens	1+1 ½ + ½ ½ + ½ ½ + ½
31.	(a) $\lambda=h/mv$ m=mass of object=10 g= 0.01 kg and v= velocity=10m/s upon substitution we get: $\lambda=6.626\times10^{-34}$ X 0.01×10 $\lambda=6.626\times10^{-33}$m (b) $n = \frac{\Delta E}{h} = \frac{E_2 - E_1}{h}$ (c) $mvr=nh/2\pi$ $2\pi r= nh/mv$ $2\pi r= n\lambda$ **OR** (a) Momentum = $h/\lambda= 6.626x10^{-34}/6.626x10^{-12} = 10^{-22}$ Kgm/s (b) $\Delta E= R_H\left(\frac{1}{n_i^2}-\frac{1}{n_f^2}\right) = 2.18\times10^{-18}\,J\left(\frac{1}{n_i^2}-\frac{1}{n_f^2}\right)$ $\Delta E = 2.18x10^{-18}\,[1/3^2 - 1/2^{2)}\,]= 2.18x10^{-18}\,[-5/36]= -30.27x10^{-20}$ J $\nu= \Delta E/h = -30.27x10^{-20}/6.626x10^{-34} = 4.57 \times 10^{14}$ Hz	2 1 2

32.	(a) $[Ar]4s^2 < [Ar]3d^{10}\ 4s^2\ 4p^6\ 5s^2$ More number of shells ionisation enthalpy more metallic character more (b) chemical elements with atomic numbers greater than 92 (c) Any two characteristics of transition elements **OR** (a) After losing 1 electron the electrons are there in the third energy shell which is closer to the nucleus hence more nuclear attraction resulting in lesser size. (b) $Mg^{2+} < Na^{+} < F^{-} < O^{2-}$ (c) located in groups 1, 2, and 13-18 of the Periodic Table. Any example (d) $(AlF_6)^{3-}$ is formed because Al has a d orbital in its valence shell, but boron does not have a d orbital in its valence shell (e) Unbibium, Ubb	2 1 2 1x5
33.	 a. sp3d2 hybridisation 90^0 Octahedral geometry b. **OR** (a) σ- 5,π -2 (b) CH_4 -sp3 , C_2H_2 – sp , CO_2- sp,C_2H_4- sp2 (c) CO_2 is linear molecule hence dipoles cancel and hence non polar while H_2O is bent hence polar (d) The compounds with a smaller cation and a larger anion have more covalent character. Since the size of Lithium-ion (Li) is much smaller than the size of Sodium ion (Na), LiCl is more covalent than NaCl	3 2 1 1 2 1 1

Compound	shape	Bond angle
H_2O	bent	104.5
NH_3	Trigonal pyramidal	107