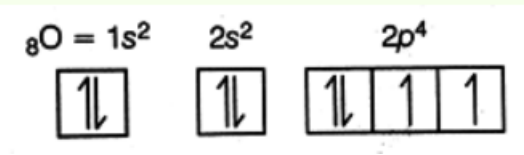
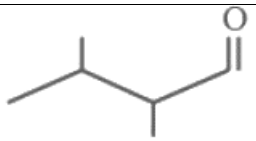
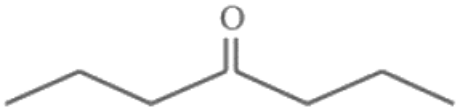
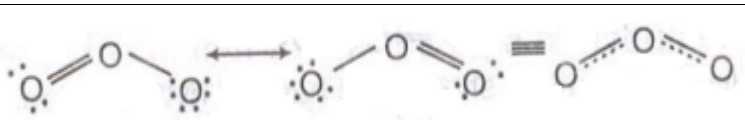
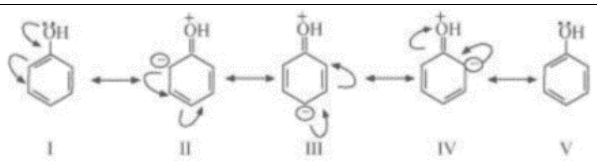
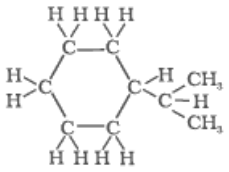
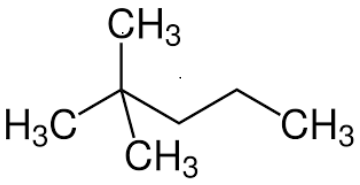
INDIAN SCHOOL AL WADI AL KABIR

SECOND ASSESSMENT 2024-2025

CLASS XI CHEMISTRY MAX MARKS: 70

1.	(c) 0.2 $molL^{-1}$	1
2.	(d) 12g He (atomic mass = 4u)	1
3.	(d) m_s	1
4.	(b) $4l + 2$	1
5.	d) Cs	1
6.	b) BeF_2 molecule is linear while H_2O is bent	1
7.	(a) halogens	1
8.	(a) CCl_4 is non-polar and water is polar	1
9.	(d) $Zn + 2AgCN \rightarrow 2Ag + Zn(CN)_2$	1
10.	(d) 10	1
11	(b) Electromeric effect	1
12	(a) 4-methoxy-2-nitrobenzaldehyde	1
13.	(a) Both A and R are true and R is the correct explanation of A	1
14	(a) Both A and R are true and R is the correct explanation of A	1
15.	(b) Both A and R are true but R is not the correct explanation of A.	1
16.	(d) A is false but R is true	1
17.	(a) The increasing order of Zeff is d<p<s. (b)  OR (a) $:1s^2 2s^2 2p^6 3s^2 3p^6 3d^8$ (b) Number of angular nodes $=l=1$ Number of radial nodes $=n-l-1=3-1-1=1$	1 1 1 ½ ½
18	(a) Trigonal planar (b) Tetrahedral (c) linear (d) trigonal pyramidal	½ x4= 2

19.	(a) P=+5 (b) $2Fe^{3+}_{(aq)} + 2I^{-}_{(aq)} \longrightarrow 2Fe^{2+}_{(aq)} + I_{2(s)}$; $E^{o} = +0.23\,V$ Reaction is feasible since E^0 is positive	1 1
20	Oxidised substance → $C_6H_6O_2$ Reduced substance → AgBr Oxidising agent → AgBr Reducing agent → $C_6H_6O_2$	1 1
21.	(a)  (b) 	2
22.	Section C (a) Law of multiple proportion (b) Any one relevant example indicating law of multiple proportion (c) 32.65 g Zn, 0.5 moles when reacts with HCl, will produce =22.7×32.65/65.3=11.35 L of H_2 at STP.	 ½ 1 1.5
23	(a) $\lambda=h/mv = 6.626x10^{-34}$ m; m conversion (b) $\Delta x=h/(4\pi\times m\Delta v)$ $=6.626\times10^{-34}/4\times3.14\times10\times10^{-3}\times3.6$ $=1.46\times10^{-33}$ m	½ +½ +½ ½ ½ ½
24.	(a) After the removal of first electron Na^+ acquires inert gas (Ne) configuration. Hence second ionisation enthalpy will be higher than Mg. (b) (i) due to the increase in nuclear charge and decrease in atomic size. (ii) while moving down the group atomic size increases due to this fact the force of attraction between the nucleus and the valence electrons is weaker. So, it becomes easy to remove an electron from an atom. **OR** (a) due to the increase in effective nuclear charge, ionisation enthalpy increases hence the non-metallic property increases across the period. Metallic property decreases. (b) In Na^+ cation, effective nuclear charge increases and the radius of cation decreases. (c) atoms and ions that have the same number of electrons. Any set of examples	1 1 1 1 1 ½ + ½

25.	(a)  (b) N_2 σ1s2 σ*1s2 σ2s2 σ* 2s2 π2px2=π2py2 σ2pz2 BOND ORDER = ½ [Nb – Na] =1/2(10-4)=3 σ1s2 σ*1s2 σ2s2 σ*2s2 π2py2=π2py2 σ2p1 For N_2^+ Bond order = 1/2(9 - 4) = **2.5** Hence N_2 is more stable than N_2^+	1 1 1
26.	(a) $Cr_2O_7^{2-}{}_{(aq)}+3SO_{2(g)}+2H^+{}_{(aq)}\longrightarrow 2Cr^{3+}{}_{(aq)}+3SO_4^{2-}{}_{(aq)}+H_2O_{(l)}$ (b) reaction in which, the same element is simultaneously oxidized and reduced.	1 1
27.	 I II III IV V (a) (b) Electrophiles are electron-deficient species that can accept electron pairs from electron-rich species. One example	2 ½ + ½
28	(a) Metamerism or position isomerism  (b)  (c)	1 1 1
29.	(a) no limiting reagent (b) 58.5 g of NaCl (c) 0 g **OR** (c) M=n/ V in L ; n= 0.002 moles	2 1 1 ½ + ½
30	(a) P<S<N<O ; Across a period the elements become more electronegative and down the group the electronegativity or non-metallic character decreases as the atomic size increases and effective nuclear charge decreases (b) (ii) Period -2, Group 17	2 1 1

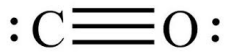
	(c) (iii) Group-14 **OR** (c) (iii) Boron	1
31.	(a)(1) It failed to explain the Zeeman effect when the spectral line is split into several components in the presence of a magnetic field. (2) It failed to explain the Stark effect when the spectral line gets split up into fine lines in the presence of an electric field. (b) $\Delta E = R_H\left(\frac{1}{n_i^2}-\frac{1}{n_f^2}\right) = 2.18\times10^{-18}\,J\left(\frac{1}{n_i^2}-\frac{1}{n_f^2}\right)$ $= 2.18\times10^{-18}(1/4^2 - 1) = -2.04\times10^{-18}$ J $\lvert\Delta E\rvert = hc/\lambda$ $\frac{(6.626\times10^{-34}\,J\cdot s)(2.998\times10^{8}\,m/s)}{2.04\times10^{-18}\,J}$ $= 9.720\times10^{-8}$ m **OR** (a) $\nu=\Delta E/h=E_2-E_1/h$ where ν is the frequency and E_2 and E_1 are the energies of the higher and lower energy state. (b) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$ (c) $\lambda=h/p$ $p= 10^{-25}$ kgm/s	2 1 ½ 1 ½
32.	(a) (i) Methane has central carbon atom with 4 H atoms (4 bonds, no lone pairs). The resulting shape is a regular tetrahedron with H-C-H angles of 109.5°. (ii) Sulphur hexafluoride central sulphur atom with F atoms (6 bonds, no lone pairs). The resulting shape is an octahedron with 90° F-S-F bond angles. (b) mixing or a linear combination of the "pure" atomic orbitals in such a way as to form new hybrid orbitals (c) (i) trigonal planar (ii) trigonal bipyramidal (iii) linear (iv) octahedral **OR** (a) (i) Tetrahedral Shape: sp3 hybridisation But, lone pairs push a bit, making the H-O-H bond angle 104.5° (ii) the hybridization of is sp3d and the shape of the molecule is trigonal bipyramidal. Equatorial bonds: 3 P–Cl bond which lies in one plane to make an angle with each other. The angle made between them is 120°.	2 1 2

Axial bonds: 2 P–Cl bonds where one lies above the equatorial plane and the other below the plane to make an angle with the plane.

1x5

(b)

sigma	pi
Sigma bonds are a result of the head-to-head overlapping of atomic orbitals	are formed by the lateral overlap of two atomic orbitals
stronger bonds	weaker compared to sigma bonds

(c) 

33. (a)

Distillation	Distillation under reduced pressure
used to separate volatile liquids from non-volatile impurities or a mixture of those liquids that have sufficient difference in boiling points	This method is used to purify a liquid that tends to decompose on boiling. Under the conditions of reduced pressure, the liquid will boil at a low temperature than its boiling point and will, therefore, not decompose.

1x5

(b) CH3-H is less polar than CH3-Cl because C -H electronegativity difference is not much as C-Cl electronegativity difference

(c) Steam distillation

(d) Homolysis; Free radical

(e) sp2

OR

1

(a) NH_3,OH^- and CN^- 1

(b) $C_2H_6 < C_2H_4 < C_2H_2$

(c) organic molecule with a negative charge on its carbon atom. When the electron pair shifts heterolytically to the Carbon atom 1

(d) +I effect and hyperconjugation 1

(e) (i) $CH_3-CH=CH-CH_3$ (ii) $CH_2OH-CHOH-CH_2OH$ ½ + ½