



Indian School Al Wadi Al Kabir

Assessment 1 (2026-2027)

CHEMISTRY

Class: XI

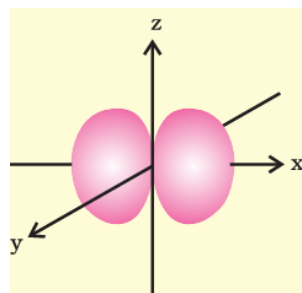
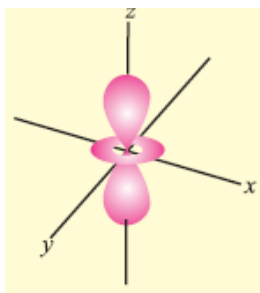
Date: 20/09/2026

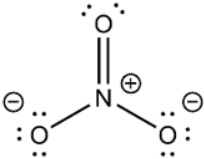
Set - 1

Max. Marks: 70

Time: 3 Hours

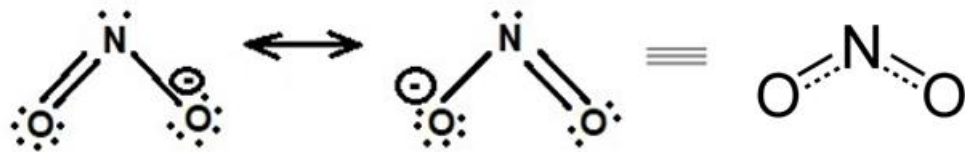
ANSWER KEY

1.	c) S		1		
2.	c) 5p		1		
3.	c) 2		1		
4.	b) X has a higher first ionization enthalpy than Y.		1		
5.	a) 0.004		1		
6.	a) 30 u		1		
7.	b) Nitrogen (N)		1		
8.	b) ns^2np^{1-6}		1		
9.	c) BF_3		1		
10.	b) NO_2		1		
11.	c) 3		1		
12.	b) Methane contains more molecules than carbon tetrachloride.		1		
13.	d) A is false but R is true.		1		
14.	a) Both A and R are true and R is the correct explanation of A		1		
15.	d) A is false but R is true		1		
16.	c) A is true but R is false.		1		
17.	a) 20 ml b) Number of neutrons = 20 Number of electrons = 18		1 $\frac{1}{2}$ $\frac{1}{2}$		
18.	a)		b)		1 1

19.	a) Molality = 1.7 mol kg^{-1} b) No unit	1½ ½
20.	a) The physical and chemical properties of the elements are periodic functions of their atomic numbers.	1
	b) Number of shells increases, shielding effect increases, Z_{eff} decreases	1
	OR	
	a) $(n-2) f^{1-14} (n-1) d^{0-1} ns^2$	1
21.	a) AlCl_3 The cation Al^{3+} has more charge than Mg^{2+}	1
	b) NaBr Br^- is a larger anion than Cl^-	1
22.	a) $\lambda = \frac{h}{mv}$ Wavelength = $0.736 \times 10^{-34} \text{ m}$	2
	b) Pairing of electrons in the orbitals does not take place until it is singly occupied.	1
23.	a) Limiting reagent is HCl	2
	b) Mass of $\text{ZnCl}_2 = 20.4 \text{ g}$	1
24.	a) P b) S c) R	3
25.	a) 	1
	b) $\ominus$ $:\text{C} \equiv \text{N}:$	1
	c) $:\text{C} \equiv \text{O}^+:$	1
26.	a) It is impossible to determine simultaneously, the exact position and exact momentum (or velocity) of an electron.	1
	b) $\Delta v \cdot \Delta x = \frac{h}{4\pi m}$	½
	$\Delta v = 5.861 \times 10^3 \text{ ms}^{-1}$	1½

27.	a) BF_3 is a symmetrical molecule. So, dipole moments cancel. b) It is the H-bond present within the same molecule. Eg; o-nitrophenol c) NH_3 In NH_3, the orbital dipole due to lone pair is in the same direction as the resultant dipole moment of the N – H bonds, whereas in NF_3, the orbital dipole is in the direction opposite to the resultant dipole moment of the three N–F bonds.	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
28.	Bond orders of O_2, O_2^-, O_2^+ are 2, 1.5 and 2.5 respectively. a) Increasing order of bond length: $\text{O}_2^+ < \text{O}_2 < \text{O}_2^-$ b) Increasing order of bond strength: $\text{O}_2^- < \text{O}_2 < \text{O}_2^+$ OR a) - The combining atomic orbitals must have the same or nearly the same energy. - The combining atomic orbitals must have the same symmetry. - The combining atomic orbitals must overlap to the maximum extent. (any two) b) i) Bond order of He_2 is zero. ii) The presence of 2 unpaired electrons in the antibonding molecular orbitals makes B_2 paramagnetic.	1 1 1 1 1 1 1 1 1
29.	a) 0.32 M b) Volume of solution changes with temperature. c) Number of moles of $\text{CaCl}_2 = 0.75 \text{ mol}$ Molality = 1 mol kg^{-1} OR c) Number of moles of $\text{NaOH} = 0.6 \text{ mol}$ Mass of $\text{NaOH} = 0.6 \times 40$ = 24 g	1 1 1 1 1 1 1 1
30.	a) The energy required to remove an electron from an isolated gaseous atom in its ground state. b) Helium (He) c) i) Boron: $+801 \text{ kJ mol}^{-1}$ (any value between 520 and 899)	1 1 1

	ii) Nitrogen: +1402 kJ mol ⁻¹ (any value between 1314 and 1681) OR c) i) $\text{Ca}^+_{(g)} \rightarrow \text{Ca}^{2+}_{(g)} + e^-$ ii) Sodium (Na)	1 1 1
31.	a) $\text{Ca}^{2+} < \text{K}^+ < \text{Cl}^- < \text{S}^{2-}$ b) This is due to the absence of d orbitals in boron. Maximum covalency of B is 4 c) Species that contain same number of electrons. Any two examples. d) Chlorine e) $\text{Li}_{(g)} + e^- \rightarrow \text{Li}^-_{(g)}, \Delta_e H^0 = -60 \text{ kJmol}^{-1}$ OR a) P has half-filled p orbitals. Therefore, more stable. S has less stable configuration. b) i) Mg^{2+} ii) Cl c) d-block, one example d) The ability of an atom in a chemical compound to attract shared electrons to itself is called electronegativity. Oxygen e) The elements after uranium are called Transuranium Elements.	1 1 ½ + ½ 1 1 1 ½ + ½ ½ + ½ ½ + ½ 1
32.	a) $r_n = \frac{52.9(n^2)}{Z} \text{ pm} \quad Z = 3, n = 3$ $= 158.7 \text{ pm}$ $E_n = -2.18 \times 10^{-18} \left(\frac{Z^2}{n^2} \right) \text{ J}$ $E = -2.18 \times 10^{-18} \text{ J}$ b) i) 1s ii) 3p c) 3f OR a) The angular momentum of an electron is given by the equation $m_e v r = n \cdot \frac{h}{2\pi}$ On rearranging. $2\pi r = n \frac{h}{mv}$ Circumference of the Bohr orbit, $2\pi r = n \lambda$	½ ½ ½ ½ 1 + 1 1 2

	b) Angular nodes, $l = 3$ Radial nodes, $n-l-1 = 4-3-1$ $= 0$ c) 3	1 1 1												
33.	a) The process of intermixing of the orbitals of slightly different energies so as to redistribute their energies, resulting in the formation of new set of orbitals of equivalent energies and shape. b) ${}_6\text{C}$ – Ground state – $1s^2 2s^2 2p^2$ - Excited state - $1s^2 2s^1 2p^3$ Hybridisation – sp^3 - Explain SHAPE: Tetrahedral BOND ANGLE: 109.5° c) Polar molecules - SO_2, CHCl_3 Non-polar molecules - CO_2, O_2 OR a)  b) <table><thead><tr><th>COMPOUND</th><th>SHAPE</th><th>BOND ANGLE</th><th>HYBRIDISATION</th></tr></thead><tbody><tr><td>SF_6</td><td>Octahedral</td><td>90°</td><td>sp^3d^2</td></tr><tr><td>BeCl_2</td><td>Linear</td><td>180°</td><td>sp</td></tr></tbody></table>	COMPOUND	SHAPE	BOND ANGLE	HYBRIDISATION	SF_6	Octahedral	90°	sp^3d^2	BeCl_2	Linear	180°	sp	1 3 $\frac{1}{2}$ $\frac{1}{2}$ 2 $1\frac{1}{2}$ $1\frac{1}{2}$
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