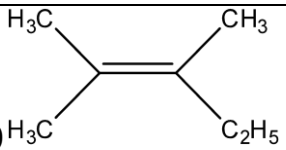
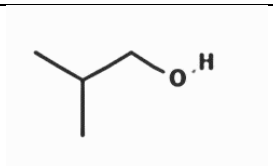
Indian School Al Wadi Al Kabir

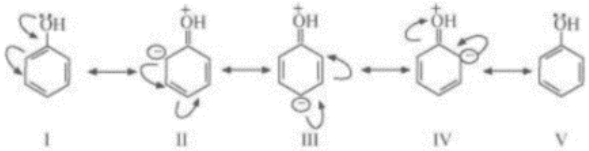
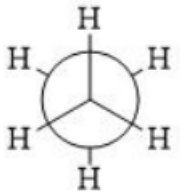
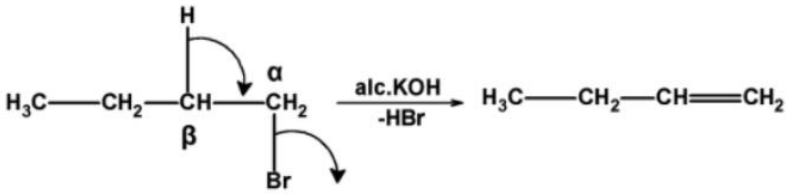
Final Examination (2024-2025)

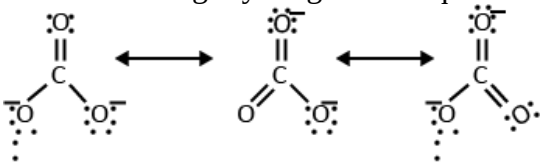
Class: XI Subject: Chemistry (043) Max. marks: 70

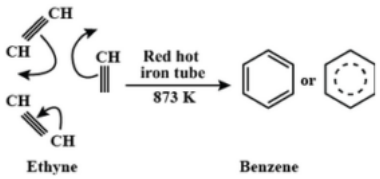
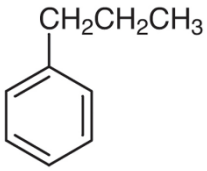
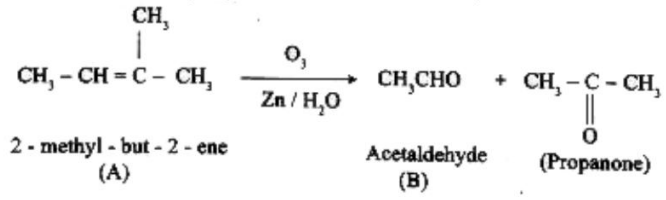
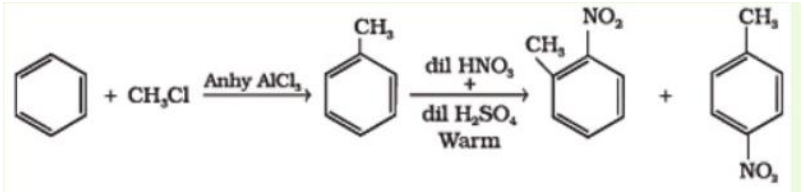
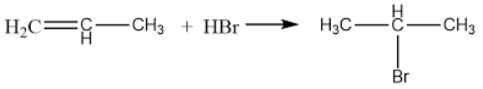
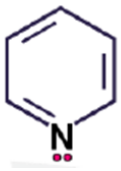
Date: 23/02/2025 SET 1 Time: 3 hours

1.	d) $1s^2,2s^2,2p^6,3s^2,3p^6,3d^5,4s^1$	1
2.	a) Size and energy of the orbit	1
3.	d) Cs^+	1
4.	d) 12, 3	1
5.	d) possible at any temperature	1
6.	b) Zero	1
7.	d) 2	1
8.	c) All the physical processes stop at equilibrium.	1
9.	b) The oxidation number of hydrogen is always +1.	1
10.	b) Fluorine	1
11	d) Steam distillation	1
12	d) 	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.	a) Both A and R are true and R is the correct explanation of A.	1
17.	(a) It states that the position and momentum of microscopic moving particles cannot be determined simultaneously with accuracy or certainty. (b) $m=100\times10^{-3}kg \quad \Delta x=10^{-10}m$ $\Delta v= 6.62x10^{-34}/4x3.14x10^{-10}\ x100x10^{-3} = 0.52x10^{-23}$ m/s OR (a) For a given value of n ,*l* can have 0 to n-1 values only (b) every orbital in a subshell is singly occupied with one electron before it is doubly occupied.	1 ½ ½ 1 1

18	$(\sigma 1s)^2\sigma*(1s)^2\sigma(2s)^2\sigma*(2s)^2\sigma(2pz)^2\pi(\pi 2px)^2\pi(2\pi y)^2\pi*(2pz)^1$ Bond order $=N_b-N_a/2 = 10-5/2=2.5$	1 1
19.	$\Delta U=Q+W$ $\Delta U=701J-394J=307J$	1 1
20	(a) (i) +6 (ii) +5 (b) Feasible because E^0 = + 0.46 V	1 1
21.	 (a) (b) sp^3 (c) NH_3, OH^-.	½ ½ ½ + ½
22.	Section C (a) Molality is measured in moles per kilogram, while molarity is measured in moles per liter. Molality is independent of temperature whereas molarity changes with change in temperature as volume changes with temperature. (b) (i) Gay Lussac's Law of Combining Volumes (ii) It states that the chemical reaction in which the gaseous reactants combine together to form one or more gaseous products, the ratio of the volumes of reactants and products will be in the whole number ratio.	1
23	(a) (i) n = 2, l = 1 (ii) n= 3, l = 2 (iii) n= 5, l = 3 (b) An orbital is the probable area of finding the maximum density of electrons in an atom. (c) $\lambda=h/mv= 6.626x10^{-34}/200x10^{-3}$ x3 = $1x10^{-33}$ m	½ +½ +½ ½ ½ + ½
24.	(I) (i) $O^{2-} > F^- > Na^+ > Mg^{2+}$ (ii) Na < Al < Mg < Si . (II) Due to stable electronic configuration **OR** **(a)** For N-shell principal quantum number n = 4 ∴ Total number of orbitals in N-shell = n^2 = 16; No of electrons = 32 **(b)** Ununoctium Uuo **(c)** O has a much smaller size than S. The electron density is high in oxygen and thus, the addition of electron is difficult.	1 1 1 1 ½ + ½ 1
25.	(a) $\Delta rH=3\Delta CO_2+\Delta N_2O-3\Delta CO-\Delta N_2O_4=3\times(-393)+(81)-3\times(-110)-(9.7)= -(777.7)KJ/mol$ (b) Mass, Internal energy	1 1 ½ + ½

26.	(a) (i) $Au(III)Cl_3$ (ii) $Sn(II)Cl_2$ (b) $6I^-_{(aq)}+2MnO_4^-{}_{(aq)}+4H_2O_{(l)}\rightarrow 3I_{2(s)}+2MnO_{2(s)}+8OH^-_{(aq)}$	½ + ½ 2
27.	 (a) Any +R effect example (b) position isomers (c) Heterolytic fission with electron pair shift towards Carbon atom	2 ½ ½
28	(a) $CH_3-CH_2-CH_2-CH_2-CH_2-CH_3 \xrightarrow[Cr_2O_3]{770K} C_6H_6$ (b)  (c) 	1 1 1
29.	(a) H_2 is the limiting reagent (b) Mass of H_2O=1.5mol×18g/mol=27g (c) Mass of CH_2O=12+2(1)+16=30. Molecular weight of compound given is 180. So, the molecular weight is 180/30=6. ⇒ Molecular formula of compound is $C_6H_{12}O_6$. **OR** (c) 7.224×10^{23} C atoms	2 1 1
30	(a) C .More electronegative. (b) (i) A and B (c) (iii) 17 and 3 **OR** (c) (iii) B,A	2 1 1 1
31.	(a) P has ground state $3s^23p^3$ first excited state configuration is $3s^13p^33d^1$. P undergoes sp3d hybridization and has trigonal bipyramidal geometry.	3

	(b) As the axial bond pairs suffer more repulsion from the equatorial bond pairs, axial bonds are slightly longer than equatorial bonds	1
	(c)  I II III	1
	OR	
	(a)  (I) (II)	1
	(b) Electronic configuration of N_2:$\sigma1s^2\sigma*1s^2,\sigma2s^2,\sigma*2s^2,(\pi2p^2x=\pi2p^2y),\sigma2p2z$ O2:$\sigma1s^2,\sigma*1s^2,\sigma2s^2,\sigma*2s^2,\sigma2p^2z,(\pi2p^2x=\pi2p^2y),(\pi*2p^1x=\pi*2p^1y)$ In N_2 all electrons are paired while O_2 has 2 unpaired electrons. These unpaired electrons are responsible for the magnetic nature of O_2. N_2 is diamagnetic & O_2 is paramagnetic in nature.	3
	(c) the water molecule has a bent or a V-shape due to the presence of lone pair-lone pair repulsions.	1
32.	(a) $Q_c = [N_2O_4]/[NO_2]^2$ $= 2/2^2 = 0.5$	2
	As K_C is more than Qc the reaction will proceed in the forward direction.	1
	(b) (i) NH_3 (ii) HCO_3^-	1
	(c)pH = 5	1
	(d) BF_3 and H^+	1
	OR	
	(a) A buffer solution is a solution where the pH does not change significantly on dilution or if an acid or base is added at constant temperature. acidic and alkaline buffer solutions. Acidic buffers are solutions that have a pH below 7 and contain a weak acid and one of its salts. For example, a mixture of acetic acid and sodium acetate. Basic buffer has a pH of more than 7. The basic buffer contains a weak base and conjugate acid as a salt. A weak base and its conjugate acid is ammonia and ammonium chloride.	3
	(b) Conjugate acid-base pair refers to the pair of compounds that differ by a proton.	1
	(c) NO_2^- ,HCN	½ + ½

33.	(a) 	1 1
	(b) 	
	(c) In the cis isomer, both the similar groups are present on the same side, hence it has a dipole moment	1
	(d) 2 - methyl - but - 2 – ene. 	½ + 1.5
	OR	
	(a) 	
	(b) Trans-But-2-ene will have a higher melting point because packing of Trans-But-2-ene has a high packing strength due to its symmetric shape.	
	(c) $2R\text{-}X + 2Na \rightarrow R\text{-}R + 2Na^+X^-$	
	(d) 	
	(e) (i)  (iii)