

INDIAN SCHOOL MUSCAT

ANNUAL EXAMINATION

FEBRUARY 2020

CLASS XI

SET A

Marking Scheme – CHEMISTRY [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	2-Chloro-4-methylhexane	1
2.	Structure	1
3.	Functional isomerism definition	1
4.	Photochemical smog	1
5.	Steam distillation	1
6.	$(n - 2) f^{l-14} (n - 1) d^{0-1} ns^2$	1
7.	Triagonal planar	1
8.	+6	1
9.	Eutrophication	1
10.	A	1
11.	B	1
12.	C	1
13.	A	1
14.	C	1
15.	C	1
16.	D	1
17.	C	1
18.	A	1
19.	D	1
20.	A	1
21.	a) Nitrogen has half-filled stable electronic configuration b) Oxygen n=2 being smaller quantum level experiences greater inter electronic repulsion OR 102-Unnilbium, 7 th period	1 1 $\frac{1}{2} + 1 + \frac{1}{2}$
22.	a) If two elements combine to form more than one compound, the mass of one element that combines with fixed mass of the other, are in the ratio of small whole numbers. b) No of moles of solute present in 1kg of the solvent	1 1
23.	a) Lowest imaginary temperature at which gases are supposed to occupy zero volume b) NH ₃ , due to higher intermolecular force	1 1
24.	a) i) +ve ii) -ve b) The entropy of a perfectly crystalline substance is zero at absolute zero.	$\frac{1}{2}$ each 1
25.	One difference + one example each OR	1+1

	a) Higher bond dissociation enthalpy b) To prevent decomposition in presence of light and on rough surfaces	1 1
26.	Similar ionic radii Any two differences	1 $\frac{1}{2}$ each
27.	a) ZSM-5 b) $H_3BO_3 \xrightarrow{\Delta} HBO_2 \xrightarrow{\Delta} B_2O_3$	1 1
28.	a) -R structures b) To eliminate the cyanide and sulphide ions which may otherwise interfere in the test	2 1
29.	$P=nRT/V$ $=(4/32+2/2)0.0821\times 273 = 25.2\text{ atm}$ OR $V=nRT/P=2\times 0.0821\times 546/2 = 44.8\text{ L}$	1 each
30.	Oxidation half: $S_2O_3^{2-} + 5H_2O \rightarrow 2SO_4^{2-} + 10H^+ + 8e^-$ Reduction half: $MnO_4^- + 4H^+ + 3e^- \rightarrow MnO_2 + 2H_2O$ Balanced equation: $8MnO_4^- + H_2O + 3S_2O_3^{2-} \rightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$	1 each
31.	a) Minimum frequency below which photoelectric effect is not observed b) Half filled stable orbitals having higher symmetry and exchange energy c) Any one difference	1 1 1
32.	a) Figure b) Mechanism Markovnikov's	$\frac{1}{2}$ each 2
33.	$\Delta H = 6x(2) + 3x(3) + 1 = 6x(-393.5) + 3x(-286) + 3267 = 48\text{ kJ/mol}$ OR $\Delta H = [600 + 4x410 + 400] - [350 + 6x410] = -170\text{ kJ/mol}$	1 each
34.	$C = 24.27/12 = 2.02 = 1$ $H = 4.07/1 = 4.07 = 2$ $Cl = 71.65/35.5 = 2.02 = 1$ $EF = CH_2Cl$ $n = 2$ $MF = C_2H_4Cl_2$ OR a) $M = \%d_{10}/\text{Molar mass} = 38x1.19x10/36.5 = 12.38M$ b) $H_2 + Cl_2 \rightarrow 2HCl$ Moles of $H_2 = 3/2$, $Cl_2 = 35.5/71$ [LR Cl_2] Mass of $HCl = 0.5x36.5x2 = 36.5\text{ g}$	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ 1
35.	a) i) 5bp, 1lp, trigonal bipyramidal, $120^\circ, 90^\circ$ ii) 4bp, 1lp, see saw/K shape b) linear shape, dipoles in opposite direction, net dipole is zero c) sp^2 hybridisation – explain OR i) electronic config, bond order=3, diamagnetic ii) two difference iii) lewis structure	1+1 1 2 $\frac{1}{2}$ 2 $\frac{1}{2}$
36.	a) i) Wurtz followed by heating in iron tube ii) Zn/HCl or alcKOH+ H_2 b) metallic sodium or Tollen's reagent	1+1 1

	c) equations OR i) But-2-ene ii) a) acetophenone b) benzene iii) Benzene – planar, has delocalised π e-, contains 6π e [4n+2, where n=1]	1 each
37.	a) Rate forward reaction=rate of backward reaction b) Equilibrium shifts to the left c) $K_p = K_c(RT)^{\Delta n}$ $\Delta n=1$ $K_c = 167/8.314 \times 10^3 = 1.87 \times 10^{-2}$ d) $K_{sp} = [Pb^{2+}][Cl^-]^2$ $1.7 \times 10^{-5} = S \times [2S]^2$ $S = 1.620 \times 10^{-2}$ OR i) H_2SO_4, SO_4^{2-} ii) Derivation iii) $pH = -\log[H^+]$ $[H^+] = 1.73 \times 10^{-4}$ iv) $pOH = pK_b + \log[\text{salt}]/[\text{base}]$ $pOH = -\log(1.85 \times 10^{-5}) + \log 2 = 5.05$ $pH = 8.95$	1 1 $1\frac{1}{2}$ $1\frac{1}{2}$ $\frac{1}{2}$ each 2 $1\frac{1}{2}$ $1\frac{1}{2}$