

MARKING SCHEME
CLASS XII TERM II
CHEMISTRY (043)

MM:35

Time: 2 Hours

1. (a) $\text{CH}_3\text{CH}_2\text{CH}_3$, CH_3OCH_3 , CH_3CHO , $\text{CH}_3\text{CH}_2\text{OH}$ 1
- (b) Butanone, propanone, propanal, ethanal 1
- (c) Acetophenone, p-tolualdehyde, Benzaldehyde, p-nitrobenzaldehyde 1
2. It states, the limiting molar conductivity of an electrolyte is equal to the sum of contribution of cations as well as anions.
Application: it helps in calculating limiting molar conductivities of weak electrolyte. 1+1
3. (a) In 2,2,6-trimethylcyclohexanone, there is steric hindrance of three methyl groups, therefore, it does not form cyanohydrin in good yield as compared to cyclohexanone which does not have steric hindrance.
- b) It is done so that ester formed does not get hydrolysed to give acid and alcohol back. It is done so as to shift equilibrium in forward direction. 1+1
4. a) It is because there is double bond character between C-X bond due to which it cannot be broken easily.
- b) It is because primary amines are associated with intermolecular H-bonding whereas tertiary amines are not.
- c) It is because there is electron withdrawing phenyl group in aromatic amines which makes them less basic than aliphatic amines in which alkyl group is electron releasing. 1+1+1

OR

- a) Reduction by Sn/HCl
- b) Reaction with ammonia followed by Br_2/KOH (degradation)
- c) Acetylation by acetyl chloride 1+1+1
5. (a) It has no unpaired electrons. 1
- (b) Formula of the compound is $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
The hybridisation of the compound is: d^2sp^3 1+1

OR

- a) Correct explanation of CFS with diagram. 3
6. (a) it is because neither Zn nor Zn^{2+} has incompletely filled d-orbital. 1
(b) It is due to small size, higher charge and presence of vacant d-orbitals of suitable energy. 1
(c) It is because Mn^{2+} is more stable than Mn^{3+} due to half filled ($3d^5$) d-orbitals, whereas Cr^{3+} is more stable than Cr^{2+} due to half-filled t^3_{2g} orbitals. 1
7. A is methanol, B is methyl methanoate, c is methanol, D is methanoic acid and E is methanamide.
8. a) It is because there are weak van der waals' forces of attraction which decrease with increase in temperature.
b) Alum coagulates the suspended impurities and makes water fit for drinking.
c) The Brownian movement has stirring effect which does not permit colloidal particle to settle and thus, it is responsible for the stability of colloidal solution. 1+1+1
9. 1 mark for each correct conversion.
10. Resistivity = 87.135-ohm cm
Conductivity= $0.001148 \text{ S cm}^{-1}$
Molar conductivity= $229.6 \text{ S cm}^2 \text{ mol}^{-1}$ 1+1+1
11. a) zinc does not have unpaired electrons and larger in size, therefore, has weak metallic bonds.
b) Mn^{2+} has $3d^5$ (stable electronic configuration), therefore, it does not get oxidized to Mn^{3+} , whereas Fe^{2+} has $3d^6$ which readily changes to Fe^{3+} which has stable configuration.
c) Sc^{3+} is colourless as it does not have unpaired electron and cannot undergo d-d transition, whereas Ti^{3+} is coloured due to presence of unpaired electrons, and undergoes d-d transition by absorbing light from visible region and radiate complementary colour.

OR

- a. It is due to absence of unpaired electrons, they do not absorb light from visible region and cannot undergo f-f transition.
b. Due to lanthanoid contraction
c. It is due similar ionic size which is due to lanthanoid contraction, they resemble in their properties.
12. i) $K = 2 \times 10^{-3} \text{ min}^{-1}$
ii) molecularity is 2, order of retain is 1
iii) second order
iv) it is because concentration of reactants decreases with time.
v) it is because powdered sugar has more surface area.