



V & C Patel English School
Mid-term Exam

Subject: Chemistry

Std: 12

Max.Marks: 70

Date: 18-09-2017

Time: 3hrs.

Questions:

1. What is the covalence of nitrogen in N_2O_5 ?
2. The enthalpies of atomization of transition metals are quite high.
3. Give an example of ionization isomerism.
4. Write the structure of the compound 4-tert-butyl-3-iodoheptane.
5. Write the IUPAC name of the following:
6. Iron has a body centered cubic unit cell with a cell dimension of 286.65 pm. The density of Iron is 7.874 g/cm^3 . Use this information to calculate Avogadro's number.
(Atomic mass of Fe = 55.8452)
7. What mass of NaCl must be dissolved in 65.0 g of water for lowering the freezing point of water by 7.5°C ? The freezing point depression constant (K_f) for water is 1.86°C/m . Assume Van't Hoff factor for NaCl is 1.87 (Molar mass of NaCl = 58.5g).
8. Calculate the e.m.f of the cell in which the following reaction takes place.
 $\text{Ni}_{(s)} + 2\text{Ag}^+ [0.002\text{M}] \rightarrow \text{Ni}^{+2} [0.160\text{M}] + 2\text{Ag}$ [Given : $E^\circ_{\text{cell}} = 1.05 \text{ V}$]
9. The rate of most reactions becomes double when their temperature is raised from 298K to 308K. Calculate their activation energy. [$R = 8.314 \text{ J.mol}^{-1}\text{K}^{-1}$]
10. Calculate the e.m.f of the following cell at 25°C .
 $\text{Ag}_{(s)} \mid \text{Ag}^+ (10^{-3}\text{M}) \parallel \text{Cu}^{+2} (10^{-1}\text{M}) \mid \text{Cu}_{(s)}$
[Given : $E^\circ_{\text{cell}} = +0.46 \text{ V}$ and $\log 10^n = n$]
11. Draw the structure of (A) H_3PO_3 (B) XeOF_4 (C) BrO_3^-
12. Complete the following reactions:
 - (a) $\text{XeF}_2 + \text{PF}_5 \rightarrow$
 - (b) $\text{XeF}_4 + \text{H}_2\text{O} \rightarrow$
 - (c) $\text{MnO}_4^- + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$
13. Give reasons for the following:
 - (a) PCl_5 can act as an oxidizing agent but not as a reducing agent.
 - (b) Dioxygen is a gas but sulphur is a solid.
 - (c) Halogens are coloured.
14. How would you account for the following?
 - (a) With the same d-orbital configuration (d^4), Cr^{+2} is a reducing agent while Mn^{+3} is an oxidizing agent?
 - (b) The actinoids exhibit a larger number of oxidation states than the corresponding members in the lanthanoids series.
 - (c) Transition elements and their compounds are generally found to be good catalysts in chemical reactions.
15. Complete the following chemical reaction equations.

- (a) $\text{MnO}_4^- (\text{aq}) + \text{S}_2\text{O}_3^{2-} (\text{aq}) + \text{H}_2\text{O} (\text{l}) \rightarrow$
 (b) $\text{Cr}_2\text{O}_7^{2-} (\text{aq}) + \text{Fe}^{+2} (\text{aq}) + \text{H}^+ (\text{aq}) \rightarrow$
 (c) $\text{Na}_2\text{Cr}_2\text{O}_7 + 2\text{KCl} \rightarrow$
16. Using valence bond theory, Name and deduce the shape, Hybridization and magnetic Behaviors of following complex $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$.
17. Give Reasons :
- Haloalkanes undergoes nucleophilic substitution whereas haloarenes undergoes electrophilic substitution.
 - Although chlorine is an electron withdrawing group. Yet it is ortho,para directing in electrophilic aromatic substitution reactions.
 - p-dichlorobenzene has higher melting point than those of o- and m- isomers.
18. Account for the following:
- Propanol has higher boiling point than butane.
 - Phenol is stronger acid than alcohol.
 - The boiling point of ethers are lower than isomeric alcohols.
19. How the following conversions can be carried out.
- Propene to propan-1-ol.
 - 1-Bromopropane to 2-bromopropane.
 - Toluene to Benzyl Alcohol.
20. How would you obtain the following.
- Benzoquinone from phenol.
 - 2-Methyl propan-2-ol from methyl magnesium bromide.
 - Propan-2-ol from propene.
21. Draw the following structures.
- $\text{H}_4\text{P}_2\text{O}_7$
 - H_2SO_3
 - XeF_2
22. Complete the following chemical reactions.
- $\text{PCl}_5 + \text{H}_2\text{O} \rightarrow$
 - $\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow$
 - $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow$
23. Write any 4 day-to-day observations for osmosis.
24. How the following conversions can be carried out?
- Benzene to 4-bromopropane.
 - Aniline to chlorobenzene.
 - 2-bromopropane to 1-bromopropane.
 - Benzene to Diphenyl.
 - Aniline to phenyl isocyanide.
25. Describe the following with an example of each.
- Reimer-Tiemann reaction.
 - Friedel-Crafts reaction.
 - Kolbe's reaction.
 - Williamson synthesis of an ether.
 - Electrophilic substitution in alcohol.
26. With the help of chemical reaction equation explain.
- Fuel cells.
 - Phenomenon of corrosion.