CHEMISTRY

1. How will you convert p-nitoraniline to 1, 2, 3-tribromo benzene?

2. Which of the solutions 1M glucose and I.M. Urea has a higher osmotic pressure.

3. Define carbylamin reaction with reaction ?

4. A first order reaction takes 60.5 minute of 50% completion. Set-up an equation for determing the time needed for 80% completion of this reaction.

5. Write the nerst equation and calculate the emf of the following cell at 298K.
$Cu(S)/Cu^{2+}$ (0.130M) || Ag + (01.00 x 10^{-4}M || Ag(S).
$E^o\ cu^{2+}/cu$ = +0.34 v and E^oAg^+/Ag = +0.80v

6. Write the reaction with condition for the following conversion.
(a) Methanal to Propan-l-o*l*.
(b) Benzyl alcohol to Benzoic acid

OR

Compare the relative stability of the following species and comment on their magnetic behavior:- O_2^- *and* N_2^+ .

7. Briefly describe each of the following:-
(a) Activation analyses
(b) Carbon dating.

8. What is the board order of (a) O_2^+ (b) N_2^+ (c) O_2^- .

OR

What type of hybrid orbital are associated with
(a) Ni atom in $[Ni(CN)_4]^{2-}$ (b) C atom in CO_3^{2-}

9. (a) What type of Inter molecular forces exists Between the following pairs.
(i) HB_r and H_2S (ii) Cl_2 and $ClBr_4$. (iii) I_2 and NO_3^- and (iv) NH_3 and C_6H_6.

OR

Discus the similarities and differences between 1s and 2s orbital.

10. On the basis of heiscenberg uncertainty principle. Show that electron cannot exist within the atomic nucleus. (Radius = 10^{-15} m)

OR

Explain why the bond order of N_2 is greater than N_2^+ ,but bond order of O_2 is less than that of O_2^+.

11. The ions of NaF and MgO all have the same number of electron. And its inter nuclear distances are about the same (235pm and 215pm) why then are the melting points of NaF and MgO so different (992°C and 2642°C).

OR

Explain the following with suitable example:-
(i) Ferrimagnetic (ii) Piezo electric effect (iii) Antiferromagnetic (iv) Ferromagnetic

12. At 300 K, 36 g of glucose present per liter in its solution has an osmotic pressure of solution is 4.98 bar. If the osmotic pressure of solution is 1.52 bar at the same temperature, what would be its concentration.

13. Why does a mole of water at 0°C have greater entropy than a mole of Ice at 0°C?

OR

Calculate the free energy and entropy change per mole , when liquid water boils against 1 atm pressure, for water ΔH vap. = 2.0723 KJ per gm

14. For the equilibrium $2H_2(g)+O_2(g) \rightleftharpoons 2H_2O(l)$ at 25°C

ΔG = -474.78 KJ per mol. Calculate log K for it.
R = 8.314 J per K per mol

OR

State third law of thermodynamics. Explain its implication.

15. The electrical resistance of 0.05 m NaOH solution of a diameter 1cm and length 50 cm is 5.55 x 10^3 ohm. Calculate resistivity, conductivity and moral conductivity.

OR

Three electrolytic cell A, B,C containing solution of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ respectively are concerned in series. A steady current of 1.5 ampere was passed through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow ? What mass of copper and of zinc were deposited.

16. (i) Write instantaneous rate expression :--- for
$2N_2O_5 \rightarrow 4NO2(g) + O2(g)$
(ii) 60% of a first order reaction was completed in 60 minute. When was its half completed?
(iii) The reaction $C_2H_5I \rightarrow C_2H_4 + HI$ is of first order and its rate constants are 3.2 x 10^{-4} s^{-1} at 600 K and 1.6 x 10^{-2} s^{-1} at 1200 K. Calculate the energy of activation for the reaction (R = 8.314 Jk^{-1} mol^{-1})

17. (a) Describe how the cleasning action of detergents differ from that of soap.
(b) Explain the Phenomenon of:-
(i)) Banomian movement (ii) Tyndall movement (iii) Lyophillic colloid (iv) Centrifugation
(c) Action of soap is due to emulsification and micelle formation comment.

18. (a) Give an example of hexadentate ligands..
(b) Write IUPAC name of $[CO(en)_2(NH_3)_2]Cl_3$.
(c) Write the ISO mers of $[Co(C_2O_4)_3]^{3-}$
(d) Using VBT explain dia-magnetic nature and square planar structure of $Ni(CN_4)^{2-}$ Ion (Atomic number of Ni = 28)

19. (a) A wood piece from an archaeological source shows ^{14}C activity which is 10% of the activity found in green wood. Calculate the age of the wood piece $t_{½}$= 5770 years.
(b) Describe the principle of nuclear reactor.
(c) Complete the following nuclear reaction.
(d) $^{246}_{96}Cm + ^{12}_{6}C \rightarrow ^{254}_{102}No$ + ……..
(e) $^{239}_{94}Pu + \ldots\ldots \rightarrow ^{242}_{96}Cm + ^{1}_{0}n$

20. (a) Assign the R and S configuration to the enantiomers of 2-chloro butane.
(b) What would be the α- obs. If.
(i) concentration of the sample
(ii) length of the polarimeter tube is doubled will specific rotation also change, if the concentration of the sample and length of the polarimeter tube are changed.

21. (a) Why is common phenol more acidic than ethyl alcohol.
(b) State one reaction as an example for the Reimer Tiemann reaction.
(c) Why is it that tertiary alcohols shows greater reactivity towards hydrogen halides than secondary and primary alcohols.
(d) Write short notes on Fries rearrangement.

22. (a) Write the IUPAC name for $C_2H_5O - C(CH_3)_3$.
(b) Formaldehyde given cannijao's reaction whereas acetaldehyde does not?

(c) An ether would possess a dipole moment even if the alkyl groups present in its are Identical? Give reason.
(d) Describe the following:-
(i) Saponification (ii) Decarboxylation
(e) Following conversion carried out----
(i) Acetic anhydride from acetic acid.
(ii) Botanic acid from I-Butanol.

23. (a) Write reaction with conditions for the following conversion.
(i) Aniline to Benzoic acid.
(ii) Nitro benzene to 2,4,6- dribromo aniline.
(b) Methylamine is stronger base than ammonia.
(c) Phenol is more easily nitrated than benzene.
(d) Write the structure for the following :-
(i) Picric acid (ii) Azoxy benzene (iii) Sulphanillic acid (iv) TNT
(c) How can you get benzonitrile from aniline.

24. (a) What is Buna-s. Name the monomer used for its preparation. Mention its used.
(b) Is (-NH – CHR-CO-)n a homopolymer or a copolymer.
(c) Will you prefer a polymerize acrylonitrile under anionic or cationic polymerization condition? Explains.
(d) What is different between thermosetting and thermoplastic polymers?
(e) What is PH BV?

25. (a) State the different between α-Helix and β-pleated sheat configuration?
(b) What are enzyme? Describe the mechanism of enzyme activity.
(c) In E"coli DNA the AT/GC ratio is 0.93. If the number of mole of adenine is its DNA sample are 465,000.
Calculate the number of moles of Guanine present.
(d)Describe:-
(i) Transcription (ii) Translation
(e) What is peptide hormone? Name any two and given their functions in the biological system.
(f) What are reducing and non- reducing sugar?, What is the structural feature characteristic reducing sugar.
(e)" Geneting code is degenerate", comment.
(f) Comment briefly on the chemical nature of insulin its physiolcal activity.

26. (a) What type of propellant were used in SLV-3 and ASL-V rocket.
(b) What is hybrid propellant.
(c) What are the antacid list some of the compound which are used and antacid.
(d) What are biodegradable and non-biodagradable detergents. What are consequences of using latter class of detergent.
(e) What are pheremones. Why are pheremones said to be action specific agents.

27. (a) Calculate the magnetic moment of Fe^{3+}.
(b) What is the formula of Nessler's reagent? What colour its gives with ammonia? Give the form formula of the iodine of millon spose.
(c) Draw structure of the following:- (i) $CrO^{2-}{}_4$ (ii) $Cr_2O_7{}^{2-}$.
(e) Transition metal have high boiling points and have high enthalpies of atomization.
(f) KmnO4 is stronger of oxidizing agent in an acidic medium than in an alkaline solution.

28. (i) Explain why pbcl_4 is less stable than sbcl_4.

(ii) Orthophosphorus acid is dibasic acid while orthophosphoric acid is tribasic.
(iii) The fist I.E. of nitrogen is greater than that of oxygen. Give reason.
(iv) CO_2 is a gas but SiO_2 is a solid.
(v) Electron affinity fluorine is less than that of chlorine.
(vi) Complete and balance the following chemical equation:-
(a) $NH_3 + NaOCl \rightarrow$
(b) $XeF_4 + SbF_5 \rightarrow$
(vii) BF_3 is weaker lewis acid than BCl_3 .
(viii) Nitrogen exists in diatomic molecule but phosphorus exists as tetra atomic Molecule. why?
(xi) What are silicate. How are they classified?
(x) What is the Oxidation State of phosphorus:-
(a) H_3PO_3 (b) PCl_3 (c) Ca_3P_2 (d) Na_3PO_4 (e) PoF_3.

29. (i) Suphur dioxide is a more powerful reducing agent in an alkaline medium than in acidic medium.
(ii) Bleaching with SO_2 is temporary, while bleaching with Cl_2 is permanent.
(iii) HF is a liquid whereas HCl, HBr and HI are gases.
(iv) Fe^{3+} is more stable than Fe^{2+}.
(v) Give diagrammatically sape and hybridization:-
(a) XeF_2 (b) XeF_4 (c) XeF_6 (d) $XeOF_2$ (e) $XeOF_4$ (f) XeO_3