Sample Paper – 2015
CLASS- XII
Subject – CHEMISTRY

Time Allowed :3 hrs. *Maximum Marks :*

General Instructions.
(i) *All questions are compulsory.*
(ii) *Marks of each question are indicated against it.*
(iii) *Question No. 1 to 8 are very short answer type questions and carry 1 mark each.*
(iv) *Question No. 9 to 18 are short answer type questions and carry 2 mark each.*
(v) *Question No. 19 to 27 are also short answer type questions and carry 3 mark each.*
(vi) *Use log tables, if necessary. Use of calculators is not allowed.*

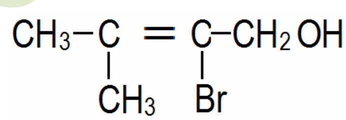
Q1) Which point defect in crystals does not alter the density of the relevant solid ? [1]

Q2) Define the term "Tyndal effect" ? [1]

Q3) Why is the froth floatation method selected for the concentration of sulphide ores? [1]

Q4) Why is Bi(v) a stronger oxidant that Sb(v) ? [1]

Q5) Give the IUPAC name of the following compound- [1]



Q6) Write the structure of 3-oxopentanal. [1]

Q7) Why is an alkafamine more basic the ammonia ? [1]

Q8) Give an example of elastomers. [1]

Q9) A reaction is second order with respect to a reactant. How will the rate of reaction be affected if the concentration of this reactant is:- [2]

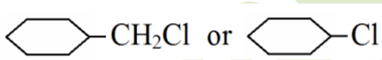
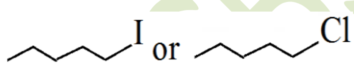
(i) doubled
(ii) reduced to half

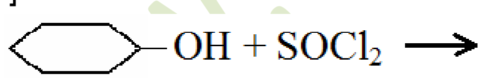
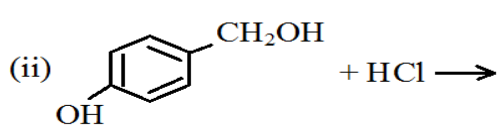
Q10) Explain the role of :- [2]
(i) Cryolite in the electrolytic reduction of alumina.
(ii) Corbon monoxide in the purification of nickel.

Q11) Draw the following chemical reaction equations:- [2]
(i) XeF_4
(ii) BrF_3

Q12) Complete the following chemical reaction equations:- [2]
(i) $P_4\,(s) + NaOH\,(aq) + H_2O\,(l) \rightarrow$
(ii) $I^-(aq) + H_2O\,(l) + O_3\,(g) \rightarrow$

Q13) Differentiate between morality and molality of a solution. what is the effect of change in temperature of a solution on its molarity and molality ? [2]

Q14) Which ones in the following pairs of substances undergoes SN_2 substitution reaction faster and why ? [2]
(i) 
(ii) 

Q15) Complete the following reaction equations:- [2]
(i) 
(ii) 

Q16) Explain what is meant by:- [2]
(i) a peptide linkage
(ii) a glycosidic linkage

Q17) Name two water soluble vitamins, their source and the diseases caused due to their deficiency in diet ? [2]

Q18) Draw the structure of the monomers of the following polymers:- [2]

(i) Teflon ii) Polyethene

OR

What is the repeating unit in the condensation polymer obtained by combining $HO_2CCH_2CH_2CO_2H$ (Succinic acid) and $H_2NCH_2CH_2NH_2$ (ethylene diamine).

Q19) Iron has a body centered unit cell with a cell edge of 286.65pm. the density of iron os $7.87 gcm^{-3}$. use this information to calculate Avogadro's number. [3]

(At mass of Fe = 56 $gmol^{-1}$.

Q20) 100 mg of a protein of dissolved in just enough water to make 10.0ml of solution.s of this solution has an osmotic pressure of 13.3mm Hg at 25°C, what is the molar mass of the protein ? [3]

Q21) A first order reaction has a rate constant of $0.00051 min^{-1}$. If we begin with 0.10 M concentration of the reactant, what concentration of reactant will remain in solution after 3 hours ? [3]

Q22) How are the following colloids different from each other in respect of dispersion medium and disposed phase ? Give one example each- [3]

i) An aerosol ii) A hydrosol iii) An emulsion

Q23) Account for the following:- [3]

i) NH_3 is a stronger base than PH_3.
ii) Sulphur has a greater tendency for catenation than oxygen.
iii) Bond dissociation energy of F_2 is less than that of Cl_2.

OR

Explain the following situations:- [3]

i) In the structure of HNO_3 molecule, the N — O bond (121pm) is shorter than N – OH bond (140 pm).
ii) SF_4 is easily hydrated whereas SF_6 is not easily hydrolysed.
iii) XeF_4 has a straight linear structure and not a bent angular structure.

Q24) For the complex $[Fe(en)_2Cl_2]$, (en= ethylene diamine) Identify-
[3]

i) The oxidation number of iron,
ii) the hybrid orbitals and the shape of the complex,
iii) the magnetic behavior of the complex,
iv) The number of geometrical isomers,
v) Whether there is an optical isomer also, and
vi) Name of the complex. (At no. of Fe=26)

Q25) Explain the mechanism of the following reaction:-
[3]

i) Addition of Grignard's reagent to the carbonyl group of a compound forming an
aduct followed by hydrolysis.
ii) Acid catalysed dehydration of an alcohol forming an alkane.
iii) Acid catalysed hydration of an alkanr forming an alcohol.

Q26) Giving and example for each describe the following reactions:-
[3]

i) Hoffmann's bromide reaction ii) Gatterman reaction.
iii) A coupling reaction.

Q27) Explain the following type of substances with one suitable example, for each case:-
[3]

i) Cationic detergents ii) Food preservatives iii) Analgesics

Q28) (a) Define molar conductivity of a substances and describe how for weak and strong electrolytes, molar conductivity changes with concentration of solution. How is such change explained ?

(b) A voltaic cell is setup at 25°C with the following half cells:-

Ag^+ (0.001M)/Ag and Cu^{2+} (0.10M)/Cu

what would be the voltage of this cell ? ($E°_{cell}$ = 0.46v)
[5]

OR

(a) State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solute related to conductivity of its solution.

(b) A voltaic cell is setup at 25°C with following half cells:-

Al/Al^{3+} (0.001M) and Ni/Ni^{2+} (0.50M)

Calculate the cell voltage [$E°_{Ni^{2+}}$ = - 0.25v, $E°_{Al^{3+}/Al}$ = -1.66]

[5]

Q29) (a) Complete the following chemical reactions equations:- [5]

i) $MnO_4^{-}{}_{(ag)} + C_2O_4^{2-}{}_{(ag)} + H^{+}{}_{(ag)} \rightarrow$

ii) $Cr_2O_7^{2-}{}_{(ag)} + Fe^{2+}{}_{(ag)} + H^{+}{}_{(ag)} \rightarrow$

(b) Explain the following observation about the transition/inner transition elements:

i) There is in general an increase in density of element from Ti (Z=22) to Cu(Z=29).

ii) There occurs much more frequent metal-metal bonding in compounds of heavy transition elements (3rd series).

iii) The members in the actinoid series exhibit a larger number of oxidation states the the corresponding members in the lanthanoid series.

OR

[5]

(a) Complete the following chemical equations for reactions:-

i) $MnO_4^{-}{}_{(ag)} + S_2O_3^{2-}{}_{(ag)} + H_2OC^{+}(l) \rightarrow$

ii) $Cr_2O_7^{-}{}_{(ag)} + H_2S_{(g)} + H^{+}{}_{(ag)} \rightarrow$

(b) Give an explanation for each of the following observations:-

i) The gradual decrease in size (actinoid contraction) from element to element is greater among theactinoids that among the lanthanoids (lanthanoid contraction)

ii) The greatest number of oxidation states are exhibited by the members in the middle of transition series.

iii) With the same d-orbital configuration (d^4) Cr^{2+} ion is reading agent but Mn^{3+} is an oxidizing agent.

Q30) (a) Illustrate the following name reactions by giving example:- [5]

i) Cannizzaro's reaction ii) Clemmensen reduction

(b) An organic compound A contains 69.77% Corbon, 11.63% Hydrogen and rest Oxygen. The molecular moss of the compound with sodium hydrogen sulphite and gives positive iodoform test. On vigorous oxidation it gives ethanoic and proparoic acids. Derive the possible structure of compound A.

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ANUJ SHARMA, DIRECTOR, EQUILIBRIUM CLASSES, SHAHJAHANPUR
Mob- 094155473342