PRE BOARD EXAMINATION (JANUARY-2019)

CLASS: XII   **CHEMISTRY**   **Time: 3 hrs.**

MAX. MARKS: 70

General Instructions:
(a)   *All questions are compulsory.*
(b)   *Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.*
(c)   *Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.*
(d)   *Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.*
(e)   *Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.*
(f)   *There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.*
(g)   *Use of log tables if necessary, use of calculators is not allowed.*

SECTION-A

1.   What type of interactions hold the molecules together in a polar molecular solid?   1

OR

What is the difference between phosphorous doped and gallium doped semiconductors?

2.   Name the type of potential difference produced between the fixed charged layer and diffused layer   1
having opposite charges around the colloidal particle.

3.   What are the various factors affecting crystal field splitting energy?   1

OR

Which of the two is more stable and why?
$K_4[Fe(CN)_6]$ Or $K_3[Fe(CN)_6]$

4.   Write the mechanism of the following reaction.   1
nBuBr+KCN-------------->nBuCN.

5.   Name the sub group in to which polymers are classified on the basis of intermolecular forces.   1

SECTION-B

6.   The boiling point of benzene is 353.23K when 1.80 g of a nonvolatile solute was dissolved in 90g   2
of benzene the boiling point is raised to 354.11K. Calculate the molar mass of the solute.(K_b for
benzene is 2.53K Kg/mol.)

OR

Calculate the mass % of benzene (C_6H_6) and CCl_4.If 22g of benzene is dissolved in 122g of CCl_4.

7. Identify the reaction and write the IUPAC name of the product formed.   2

$C_6H_5COCl \xrightarrow[\text{PdBaSo4}]{H_2}$

$C_6H_6 \xrightarrow[\text{An.AlCl}_3]{CO,HCl}$
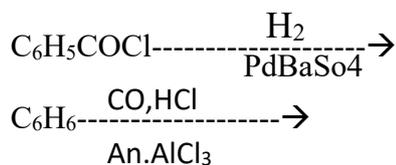
OR

Write the structures and IUPAC names .of aldol condensation products of ethanal and propanone

8. (a) What are the monomeric repeating units of Nylon--6 and Nylon-6,6?   2
   (b) Distinguish between addition polymers and condensation polymers. Give one example each.

9. Write the mechanism of acid dehydration of ethanol to yield ethane.   2

10. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life of the reaction.   2

11. Draw the structure of   2
    a)XeF_2
    b)$H_2S_2O_8$

12. The sum of first and second ionization enthalpies and third and fourth ionization enthalpies of nickel and platinum are   2
    IE_1+IE_2(MJ/mol)
    Ni -----2.49
    pt-------2.66
    IE_3+IE_4(MJ/mol)
    Ni-----8.80
    Pt-----6.70
    Based on the above information answer the following questions.
    (i)Which is the most common oxidation state of Ni and Pt. Why?
    (ii)Out of the two name the metal which can easily form compounds in +4 oxidation state and why?

SECTION-C

13. Iron has a bcc unit cell with cell edge of 286.65 pm.The density of iron is 7.87g/cm3.Use this information to calculate Avogadro's number.(Atomic mass of Fe=56g/mol.   3

14. (a)Define an ideal solution and write one of its characteristics.   3
    (b)Some liquids on mixing form azeotropes. What are azeotropes?
    (c)State Henry's law. What is the effect of temperature on the solubility of a gas in a liquid?

15. How would you obtain   3
    (i)Picric Acid from phenol.
    (ii)2-methyl propene from 2-methyl propanol.
    (iii)Write the equation involved in Reimer --Tieman Reaction?

16. (i)Write the isomers of compound having molecular formula C_4H_9Br ?   3
    (ii)Define Chiral and achiral molecules with one example each(use wedge and dash representation)

OR

    (a)Define racemization. Give one example.
    (b)Account for the following.
    Halo alkanes undergo nucleophilic substitution whereas halo arenes undergo electrophilic substitution.

17. Complete the following reactions.   3
    An.AlCl3

(a)$C_6H_6 + C_6H_5COCl$ ----------->
(b)Cyclohexanol ----- $\xrightarrow{CrO3}$ >
(c)$C_6H_5CHO + CH_3CH_2CHO$ $\xrightarrow{dil.NaoH}$ >

18. What are analgesic drugs? How are they classified and when are they usually recommended for use?   3

19. Differentiate between fibrous protein and globular proteins. What is meant by the denaturation of a protein?   3

OR

(a)Write the Zwitter ion structure of glycine?
(b)What is meant by inversion of sugar?
(c)Name the vitamin in each case whose deficiency causes
(i)Night blindness
(ii).Poor coagulation of blood.

20. (a)Define activation energy. How is it affected by a rise in temperature?   3
(b)In a reaction between A and B the initial rate of reaction (r0) was measured for different initial concentrations of A and B given below.
A/mol/L.   0.20.   0.20   0.40
B/mol/L.   0.30.   0.10.   0.05
r0/mol /L/s 5.07×10^{-5} 5.07×10^{-5} 1.43×10^{-4}

21. (a) Compare physical and chemical adsorption in terms of rate and prevailing temperature.   3
(b) Show graphically how the amount of gas adsorbed on a solid in physical adsorption varied with
(i) pressure
(ii) temperature.

OR

The time required for 10% completion of a first order reaction at 298K is equal to that required for its 25% completion at 308K. if the value of A is 4×10^{10}/s. Calculate K at 318K and Ea.

22. Explain the role of each of the metals from their ores.   3
(i)CO in the extraction of nickel.
(ii)Zn in the extraction of silver.
(iii)Silica in the extraction of copper.

OR

Describe how the following changes are brought about:
(i)pig iron to steel.
(ii)Zinc oxide into metallic zinc.
(iii)Impure titanium in to pure titanium.

23. (a)Complete the following chemical equations   3
(i)$MnO_4^-(aq) + S_2O_3^{2-}(aq) + H2O(l)$ --------->
(ii)$Cr2O_7^{2-}(aq) + Fe^{2+}(aq) + H^{(+)}$ ------>
(b)State reason for the following.
   Cu(I) ion is not stable in an aqueous solution.

24. (a) Write the shape and the magnetic behavior of the following complex entities.   3
(i)$[Cr(NH_3)4Cl_2]Cl$
(ii)$K_2[No(CN)_4]$.

(b) Write the formula of the following coordination compound
   Di chlorido bis (ethane1,2 di amine)cobalt (111) chloride

Section-D

25. (a)   5
(i)$C_6H_5N_2Cl + C_6H_5NH_2$ ------- $\xrightarrow{oH^-}$

(ii)$C_6H_5N_2Cl+CH_3CH_2OH$------>
(iii)$CH_3NH_3+CHCl_3+KOH$--->

(b)Distinguish between
(i)Ethanal and propanal.
(ii)Phenol and benzoic acid.

OR

(a)Account for the following.
(i)Aniline does not undergo Friedal Crafts Reaction.
(ii)Gabriel phthalimide synthesis is preferred for synthesizing 1°Amines.
(iii)Ethyl amine is soluble in water whereas aniline is not.

(b)Arrange the following.
(i)$C_6H_5NH_2,C_6H_5N(CH_3)_2$, $(C_2H5)_2NH,CH_3NH_2$(In increasing Order of basic strength)
(ii)$C_2H_5NH_2,C_6H_5NHCH_3,(C_2H_5)_2NH$and $C_2H_5NH_2$,(in decreasing order of P^{kb} values.

26. Write Nernst's equation and Emf of the following cells at 298K.   5
    $Mg/Mg2+(0.001M)//Cu2+(0.0001M)/Cu$.
    [$E°Cu2+/Cu=0.34v$ and
    $E°Mg2+(aq)/Mg(s)$=---2.36v]
    In a button cell widely used.in watches and other devices the following reaction takes place.
    $Zn(s)+Ag_2O+H_2O$------>$Zn2+-2Ag+ +OH-$
    Determine E°and ΔG° for the .reaction.
    [$E°Zn2+(aq)/Zn(s)$=-0.76V] and
    $E°2Ag^+(aq)/Ag(s)$=0.34V

OR

(a) The electrical resistance of a column of 0.05mol/L NaOH solution of diameter 1cm and length.50cm is $5/55×10^3$ohm. Calculate its resistivity , conductivity and molar conductivity.

(b) Write the chemistry of recharging lead storage battery ,highlighting all materials that are involved during recharging.

27. Account for the following.   5
    (1) zirconium and Hafnium exhibit almost similar properties.
    (2) Zn salts are white while Cu^{2+}salts are coloured.
    (3) The transition elements have high enthalpies of atomisation.
    (4) What is the cause of and consequences of Lanthanoid Contraction?
    (5) Give balanced chemical equations for the following reactions.
        (i)Between acidified potassium di Chromate and KI.
        (ii)Chromite ore is fused with NaOH in air.
    OR
(a) Describe the preparation of K2Cr2O7 from the chromate ore[$FeCr_2O_4$].write the chemical equations for the reactions involved.

(b) Represent the reactions of K2Cr2O7 With
    (i)KISolution
    (ii)FeSO₄ Solution with the help of balanced chemical equation.

(c) Draw the structure of Chromite Ion.