FIRST PRE-BOARD EXAMINATION (2017–18)
CLASS: XII

Subject: CHEMISTRY   **Date: 20.12.2017**

Time allowed: 3 Hours.   Maximum Marks: 70

General instructions:
  (1) **All** questions are **compulsory**.
  (2) Question nos. 1-5 are very short answer questions and carry 1 mark each.
  (3) Question nos. 6-10 are short answer questions and carry 2 marks each.
  (4) Question nos.11-22 are also short answer questions and carry 3 marks each
  (5) Question nos.23 is a value based questions and carry 4 marks
  (6) Question nos.24-26 are also long answer questions and carry 5 marks each
  (7) Use log tables if necessary, use of calculators is not allowed.
  (8) Marks are indicated against each question.
  (9) Please check this question paper contains **6** printed pages only.
  (10) Please check that this question paper contains **26** questions.

1. What is the coordination number of atoms :
    a) in a cubic close packed structure
    b) in a body centred cubic structure?   1

2. What type of colloid is formed when a gas is dispersed in liquid?
    Give an example.   1

3. Write the IUPAC name of the given compound: 1
    $$CH_3 - O - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$$

4. Haloarenes undergo electrophilic substitution reaction. Give reason
                                                                   1
5.   What happens when methyl amine is treated with nitrous acid? 1

6. Explain the following
    i) Peptide linkage

ii) Essential amino acid

iii)Pyranose structure of β-D-Glucose   2

7. i) Write a reaction to show that glucose contains an aldehydic group.
   ii) What do you mean by anomers?

OR

   i) "The two strands of DNA are not identical but are
       complementary". Explain
   ii) What are vitamins? Deficiency of which vitamin causes
        convulsions?   2

8. The vapour pressure of pure benzene at a certain temperature is
   0.850bar. A non-volatile, non-electrolyte solid weighing 0.5 g when
   added to 39.0 g of benzene (molar mass 78 g mol^{-1}). Vapour pressure
   of the solution, then, is 0.845 bar. What is the molar mass of the solid
   substance?   2

9. i) Define fuel cell.
   ii) Write the reactions taking place at the cathode and anode during
       the working of a mercury cell.   2

10. i) Write down the IUPAC name of the following complex :
        $[Cr(NH_3)_2Cl_2(en)]Cl$ (en = ethylenediamine)
    ii) Write the formula for the following complex:
         Pentaamminenitrito-o-Cobalt (III).   2

11.i) State Henry's law
   ii) Define azeotropes. What type of azeotropes is formed by positive
       deviation from Raoult's law? Give an example.   3

12.Write the principle of the following:
   i) Zone refining
   ii) Froth floatation
   iii)Chromatography.   3

13. Represent the cell in which the following reaction takes place.
    $Mg(s) + 2Ag^+(0.0001M) \rightarrow Mg^{2+}(0.130M) + 2Ag(s)$
    Calculate its $E_{(cell)}$,if $E^0_{(cell)} = 3.17$ V.

OR

Conductivity of 0.00241 M acetic acid is 7.896×10^{-5} S cm^{-1}. Calculate its molar conductivity and if $\Lambda^o m$ for acetic acid is 390.5 S cm^2 mol^{-1}, what is its dissociation constant?　　　　　　　　　　　　　3

14. Assign reason for the following
    i) Bi(V) is a stronger oxidizing agent than Sb(V)
    ii) Of all the noble gases only xenon is known to form compounds.
    iii) H_2S is more acidic than H_2O.　　　　　　　　　　　3

15. i) Write the structures of the monomers used for getting the following polymers.
    a) Teflon
    b) Melamine-formaldehyde polymer
    c) Neoprene
    d) Buna_N
    ii) Differentiate between homopolymers and copolymers.　　　3

16. i) Following compounds are given to you:
    2-Bromopentane, 2-Bromo-2-methylbutane, 1-bromopentane.
    a) Write the compound which is most reactive towards S_N2 reaction.
    b) Write the compound which is optically active.
    c) Write the compound which is most reactive towards β-elimination reaction

    ii) Write the structure of the major product in each of the following reactions :

    a)

    b)

    c)　CH$_3$CH$_2$Br + KNO$_2$ →　　　　　　　　　　　　　3
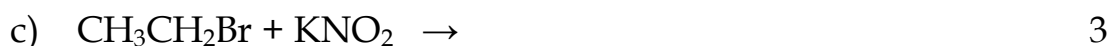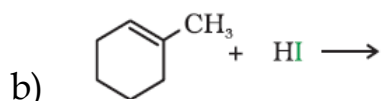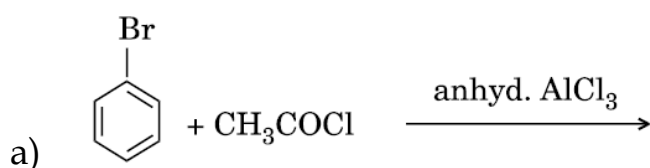
17. i) Explain the following with an example:
    a) Reimer Tiemann reaction
    b) Williamson synthesis

ii) Name the reagents used in the following conversions:
   a) Ethanol to ethanal.
   b)Benzyl alcohol to benzoic acid.   3

18. An element has a ccp structure with radii of atoms 141.4pm.The
    density of the element is $8g/cm^3$. How many atoms are present in
    220g of this element?   3

19. i) Draw the structures of
        a) $XeOF_4$ b) $(HPO_3)_3$
    ii) Arrange the following in increasing order of property indicated:
        a) F_2, Cl_2, Br_2, I_2 (bond dissociation enthalpy)
        b) $NH_3, AsH_3, PH_3, SbH_3, BiH_3$ (basic strength)   3

20. i) Give reasons for the following:
       a) Aromatic amines are weaker bases than aliphatic amines.
       b) Methyl amine in water reacts with ferric chloride to precipitate
          hydrated ferric oxide.
    ii) Write the structures of the main product formed when benzene
        diazonium chloride reacts with the following
           a) Phenol   b) C_2H_5OH 3

21. i) For the complex $[Fe(CO)_5]$, write the hybridization, magnetic
        character and spin of the complex. (At. number: Fe = 26)
    ii) Define crystal field splitting energy.
    iii) Out of NH_3 and 'en', which ligand forms more stable complex
         with metal and why ?   3
22. Define the following terms
    i) Chemisorption
    ii) Multimolecular colloids
    iii) Peptization   3

23. Sapna a domestic helper of Mrs. Sheela had a wound on her arm, but
    she was not caring for it. Sheela applied Dettol on her wound and
    asked her to show it to a doctor, if it does not get cured.
    i) What type of drugs are used for external injuries (like cuts)?
    ii) Name the components of Dettol.
    iii) Name two more substances used for the same purpose.

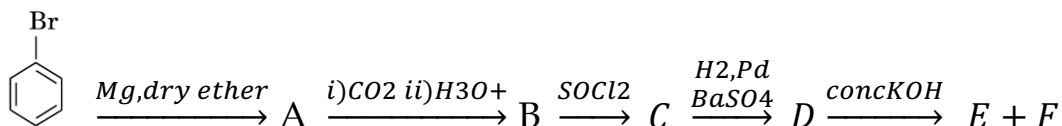iv) What are the values displayed by Mrs. Sheela? 4

24. i) Aldehydes are more reactive than ketones towards nucleophilic addition reactions. Give reason.

ii) Identify the following named reactions and write the reagents used:

$$CH_3CHO \rightarrow CH_3\text{-}CH_3 + H_2O$$

iii) Complete the following reaction sequence and write the structures of A,B,C,D,E and F

$$\underset{\text{Br}}{\bigcirc} \xrightarrow{Mg, dry\ ether} A \xrightarrow{i)CO2\ ii)H3O+} B \xrightarrow{SOCl2} C \xrightarrow[BaSO4]{H2,Pd} D \xrightarrow{concKOH} E + F$$

OR

i) Give a chemical test to distinguish between the following compounds

   a) Benzoic acid and phenol

   b) Ethanal and acetone

ii) How will you bring about the following conversions:

   a) Propanone to propene.

   b) Benzene to p-nitrobenzoic acid.

   c) Ethanal to but-2-enal 5

25. i) For a reaction $A + B \rightarrow P$, the rate is given by

   $$\text{Rate} = k[A][B]^2$$

   a) How is the rate of reaction affected if the concentration of B is doubled ?

   b) What is the overall order of reaction if A is present in large excess?

ii) A first order reaction takes 30 minutes for 50% completion. Calculate the time required for 90% completion of this reaction.

OR

i) The reaction between A and B is first order with respect to A and zero order with respect to B. Fill in the blanks in the following table:

Experiment	[A] mol /L	[B] mol/ L	Initial rate mol /L/min
I	0.1	0.1	2×10^{-2}
II	-	0.4	4×10^{-2}
III	0.4	0.4	-

ii) Differentiate between

   a) Average rate and instantaneous rate.

   b) Rate expression and rate constant of a reaction.   5

26. Account for the following
   i)   Transition metals acts as good catalysts.
   ii) Enthalpy of atomization is minimum for zinc in 3d series of
        transition elements.
   iii) Hf and Zr have nearly the same size. Give reason.
   iv) Complete the following equations
        a) $2MnO_2 + 4KOH + O_2 \rightarrow$
        b) $Cr_2O_7^{2-} + OH^- \rightarrow$
                        OR

State reasons for the following:
i)   Cu+ is not known in aqueous solution.
ii) Name an important alloy which contains some lanthanoid
     metals. Mention its use.
iii) Compare the chemistry of actinoids with that of lanthanoids with
     special reference to
      a) electronic configuration
      b) oxidation state
      c) chemical reactivity.   5

****