

## COMMON PRE-BOARD EXAMINATION 2017-2018

### CHEMISTRY

#### CLASS XII

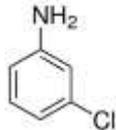
Time Allowed: 3 hours

Maximum Marks: 70

#### General Instructions:

- (i) There are **26** questions in **all**. **All** questions are compulsory.
- (ii) Questions number **1** to **5** are very short-answer questions and carry **1** mark each.
- (iii) Questions number **6** to **10** are short-answer questions and carry **2** marks each.
- (iv) Questions number **11** to **22** are also short-answer questions and carry **3** marks each
- (v) Question **23** is a value based question and carries **4** marks
- (vi) Questions number **24** to **26** are long-answer questions and carry **5** marks each.
- (vii) Use log tables, if necessary. Use of calculators is **not** allowed.

Number of printed pages – 6

- 1 What makes alkali metal halides sometimes coloured, which are otherwise colourless? 1
- 2 How can a colloidal solution and true solution of the same colour be distinguished from each other? 1
- 3 Draw the noble gas species isostructural with  $\text{BrO}_3^-$ . 1
- 4 Write the IUPAC name of the following compound: 1  

- 5 Write chemical equation for the reaction of propanone with methylmagnesium bromide followed by hydrolysis. 1

6 What is meant by negative deviation from Raoult's law? Draw a diagram to illustrate the relationship between vapour pressure and mole fraction of components in a solution to represent negative deviation. 2

7 Arrange the following in decreasing order of their basic strength: 2  
(a)  $C_6H_5NH_2$ ,  $C_2H_5NH_2$ ,  $(C_2H_5)_2NH$ ,  $NH_3$   
(b) Aniline, p-nitroaniline and p-toluidine

OR

Describe Hinsberg method for the identification of primary, secondary and tertiary amines. Also write the chemical equations of the reactions involved.

8 Draw structures of the following: 2  
(a)  $PCl_5$  (gas) (b)  $H_2S_2O_8$

9 Write the IUPAC names of the following complexes: 2  
(a)  $[Cr(CN)_6]^{3-}$   
(b)  $K_4[Fe(CN)_6]$

10 For a reaction :  $2NH_{3(g)} \xrightarrow{Pt} N_{2(g)} + 3H_{2(s)}$  2  
Rate = k  
(i) Write the order and molecularity of this reaction.  
(ii) Write the unit of k.

11 Niobium crystallises in body-centred cubic structure. If its density is  $8.55 \text{ g/cm}^3$ , calculate atomic radius of niobium using its atomic mass 93u. 3

12 Calculate the osmotic pressure at  $25^\circ\text{C}$  and freezing point of 1.8% glucose (molar mass = 180 g/mol) solution. Assume ideal behavior of the solution. Take density to be 1g/ml,  $K_f$  of water 1.86 K kg/mol and  $R=0.0821 \text{ L atm/K/mol}$ . 3

13 State the role of the following: 3  
(a) NaCN in the extraction of silver.  
(b)  $SiO_2$  in the extraction of copper.  
(c) Cryolite in the electrometallurgy of aluminium.

- 14 Explain what happens when: 3
- An electrolyte is added to ferric hydroxide sol?
  - Ferric chloride is added to freshly precipitated ferric hydroxide?
  - Electric current is passed through a sol?

OR

Differentiate between:

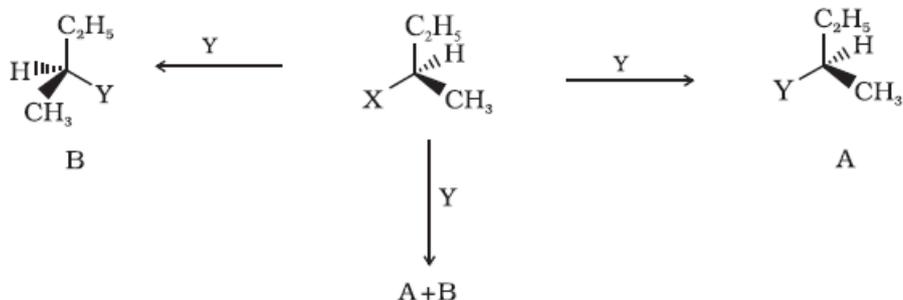
- Physisorption and chemisorption.
  - Coagulation and peptization.
  - Lyophilic and lyophobic sols.
- 15 At 1100 K, the following data was obtained on the homogeneous reaction: 3



Exp.	[NO] (mole dm <sup>-3</sup> )	[H <sub>2</sub> ] (mole dm <sup>-3</sup> )	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1.	$5 \times 10^{-3}$	$2.5 \times 10^{-3}$	$3 \times 10^{-5}$
2.	$15 \times 10^{-3}$	$2.5 \times 10^{-3}$	$9 \times 10^{-5}$
3.	$15 \times 10^{-3}$	$10 \times 10^{-3}$	$3.6 \times 10^{-4}$

- Calculate the order of the reaction with respect to NO and H<sub>2</sub>
  - Write the rate law expression and overall reaction order.
  - Calculate the rate constant of the reaction.
- 16 Give reasons: 3
- Chlorine is a permanent bleach but SO<sub>2</sub> is a temporary bleach.
  - Noble gases have low boiling points.
  - H<sub>3</sub>PO<sub>2</sub> is a good reducing agent.
- 17 (a) For the complex [Fe(CN)<sub>6</sub>]<sup>3-</sup>, write the hybridization type, magnetic character and spin nature of the complex. (At. number : Fe = 26). 3
- (b) Draw one of the geometrical isomers of the complex [Pt(en)<sub>2</sub>Cl<sub>2</sub>]<sup>2+</sup> which is optically active.
- 18 Write the chemical equations involved in the following: 3
- Preparation of phenol from cumene.
  - Treating phenol with chloroform in presence of aqueous NaOH.
  - Dehydration of ethanol to yield ethene.

- 19 There are three products possible in the following nucleophilic substitution reaction taking place at asymmetric carbon. 3



Name the process if:

- (a) A is the only product formed.
- (b) B is the only product formed.
- (c) A and B both are formed
- 20 Give plausible explanation for each of the following: 3
- (a) Why are amines less acidic than alcohols of comparable molecular masses?
- (b) Why do primary amines have higher boiling point than tertiary amines?
- (c) Why are aliphatic amines stronger bases than aromatic amines?
- 21 (a) Explain the terms: 3
- (i) Essential aminoacids.
- (ii) Denaturation of protein
- (b) What happens when D-glucose reacts with HI?
- 22 Draw structures and name the monomers of the following polymers: 3
- (a) Teflon
- (b) Buna-S
- (c) Nylon 6,6

- 23 Due to hectic and busy schedule, Mr. Angad made his life full of tensions and anxiety. 4  
He started taking sleeping pills to overcome the depression without consulting the doctor. Mr. Deepak, a close friend of Mr. Angad, advised him to stop taking sleeping pills and suggested to change his lifestyle by doing Yoga, meditation and some physical exercise. Mr. Angad followed his friend's advice and after few days he started feeling better.

After reading the above passage, answer the following :

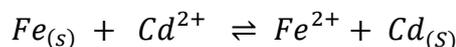
- What are the values (at least two) displayed by Mr. Deepak?
- Why is it not advisable to take sleeping pills without consulting a doctor?
- What are tranquilizers? Give two examples.

- 24 (a) Following reactions occur at cathode during the electrolysis of aqueous copper(II) 5  
chloride solution :



On the basis of their standard reduction electrode potential ( $E^{\circ}$ ) values, which reaction is feasible at the cathode and why ?

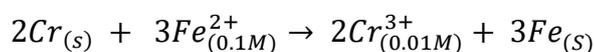
- State Kohlrausch law of independent migration of ions. Write its one application.
- Calculate the equilibrium constant for the reaction



$$\text{Given : } E^{\circ} \text{ Cd}^{2+} / \text{Cd} = -0.40 \text{ V, } E^{\circ} \text{ Fe}^{2+} / \text{Fe} = -0.44 \text{ V}$$

OR

- Define molar conductivity of a substance. With the help of graph explain how for weak and strong electrolytes, molar conductivity changes with concentration of solute.
- Calculate e.m.f of the following cell at 298 K :



$$\text{Given : } E^{\circ} \text{ Cr}^{3+} / \text{Cr} = -0.74 \text{ V, } E^{\circ} \text{ Fe}^{2+} / \text{Fe} = -0.44 \text{ V}$$

- 25 (a) What is lanthanoid contraction? Give its consequences. 5  
(b) Which of these ions are stable in aqueous solutions?:



(c) Give reasons:

- (i) The first ionization enthalpy values show irregularity across the first transition series.
- (ii) Cu is the only transition element in the 3d series with positive  $E^0$  value.
- (iii) Actinoid contraction is greater from element to element than lanthanoid contraction.

OR

(a) Describe the preparation of  $\text{KMnO}_4$  from pyrolusite ore.

(b) Complete the following equations:

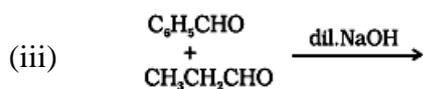
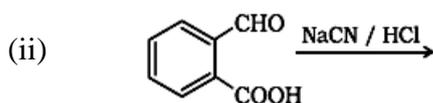
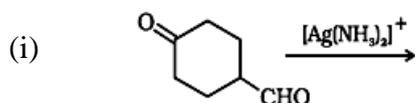
- (i)  $\text{MnO}_4^- + \text{Fe}^{2+} \rightarrow$
- (ii)  $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- \rightarrow$
- (iii)  $\text{CrO}_4^{2-} + \text{H}^+ \rightarrow$

26 (a) How will you convert the following:

5

- (i) Ethyl benzene to benzoic acid?
- (ii) Toluene to benzaldehyde?

(b) Complete the following reactions:



OR

Write the structures of A, B, C, D and E in the following reactions:

