

Mock Board Exam

STD: XII
Maximum marks : 35

SUBJECT: Chemistry
19/3/2022 11:00 - 19/3/2022
22:30

ASSESSMENT: Mock Test
Time Limit : 120 Minutes

GENERAL INSTRUCTIONS:

Read the following instructions carefully.

1. There are 12 questions in this question paper with internal choice.
2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculators is not allowed
7. A students has to answer a question either by typing it out, in the space provided, or writing down each answer on paper, and uploading a picture of it using the upload option.
8. A student is advised to write the answers in a clear, legible handwriting using a blue/black ball point pen before uploading it.

Section A

6 Marks

6 Marks

- 1 Arrange the following in the increasing order of their property indicated [Any Two] 2 M
 - (a) Mn, W, Mo, Cr(Melting point)
 - (b) Cr, V, Ti, Sc(Enthalpy of atomisation)
 - (c) Eu^{3+} , Pm^{3+} , Er^{3+} , Lu^{3+} (Ionic radii)
- 2 Calculate the limiting molar conductivity of acetic acid (CH_3COOH), if the limiting molar conductivity of $CaCl_2$, HCl and $(CH_3COO)_2Ca$ are x, y and z $S\ cm^2\ mol^{-1}$ respectively. 2 M
- 3 Give reason to support your answer 2 M
 - (a) Aniline cannot be prepared from Gabriel phthalimide synthesis.
 - (b) The order of boiling point of isomeric amines is : $1^\circ > 2^\circ > 3^\circ$

Section B

24 Marks

24 Marks

- 4 Convert the following. 3 M
 - (a) Propyne to propan-2-one
 - (b) Chloroethane to propanal
 - (c) Benzene to m-nitroacetophenone

OR

Account for the following.

3 M

- (a) Benzoic acid do not undergo Friedel Crafts reaction.
- (b) For the preparation of acid chloride from carboxylic acid, the preferred reagent is thionyl chloride
- (c) pK_a of 4 methoxy benzoic acid is greater as compared to benzoic acid.

5 Answer the following questions.

3 M

- (a) What is the unit of rate constant for a second order reaction?
- (b) Show that in a first order reaction, time required for the completion of 99.9 % is 10 times of the half-life $\left(t_{\frac{1}{2}}\right)$ of the reaction

OR

(a) What is the slope of the plot of concentration of reactant vs time for a zero reaction?

3 M

(b) The conversion of molecules X to Y follow second order kinetics. If concentration of X is increased to three times how will it affect the rate of formation of Y?

6 Account for the following.

3 M

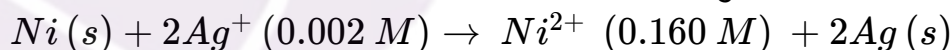
- (a) Cr^{2+} is reducing and Mn^{3+} is oxidizing when both have d^4 to d^3 configuration.
- (b) Highest oxidation states of a metal exhibited in its oxide or fluoride only.
- (c) Many trivalent lanthanoid ions are coloured both in the solid state and in aqueous state.

7 An organic compound A with molecular formula C_8H_8O forms semicarbazone on reaction with semicarbazide and gives a yellow precipitate on heating with iodine in the presence of sodium hydroxide. It does not reduce Tollen's reagent. On drastic oxidation with chromic acid, it gives carboxylic acid (B). On reaction with dil. NaOH followed by heating, it gives (C). Identify the compounds A, B and C and explain the reactions involved.

3 M

8 Calculate the emf of the cell in which the following reaction takes place:

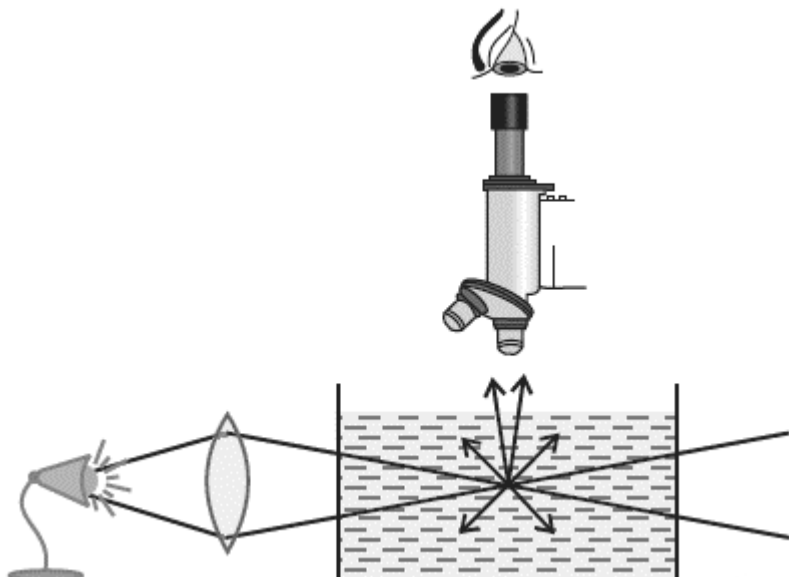
3 M



Given that $E_{cell}^{\circ} = 1.05 V$

9 Observe the figure given below and answer the questions that follow.

3 M



- Which process is represented in the figure?
- Can the same process occur when the diameter of the dispersed particle is smaller than 1 nm?
- Does this effect depend upon the charge of colloidal particle?

10 What happens when

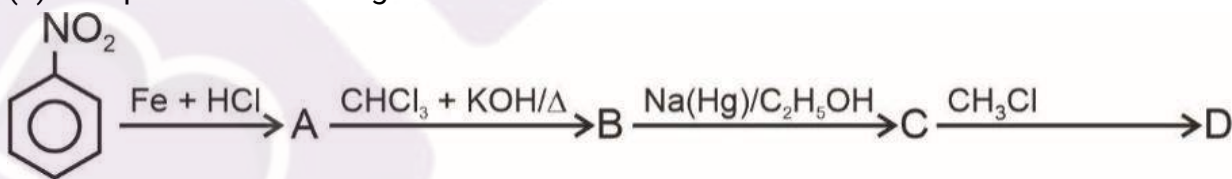
3 M

- Benzamide reacts with bromine in an aqueous or ethanolic solution of sodium hydroxide?
- Methanamine reacts with benzoyl chloride?
- Aniline reacts with conc. nitric acid and conc. sulphuric acid at 288 K?

OR

- Write the IUPAC name of o-Toluidine
- Complete the following

3 M



11 (a) Define electrophoresis

3 M

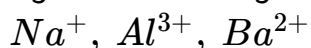
- Lyophilic colloids are reversible sols Explain.
- What are the dispersed phase and dispersion medium of foam. Give 2 examples of foam.

OR

(a) Define coagulating value.

3 M

(b) Arrange the given ions, in the increasing order of the flocculating power, for the coagulation of a negative sol.



(c) Give 2 differences between chemisorption and physisorption.

Section C

5 Marks

5 Marks

Read the passage given below and answer the questions that follow.

The chemistry of coordination compounds is an important and challenging area of modern inorganic chemistry. Starting with nomenclature, because of the need to have an unambiguous method of describing formulas and writing systematic names. The first systematic attempt at explaining the formation, reactions structure and bonding of a coordination compound was made by A. Werner. Another theory is VBT, valence bond theory which explains with reasonable success, the formation, magnetic behaviour and geometrical shapes of coordination compounds. Another theory is CFT which is based on the effect of different crystal fields, on the degeneracy of d-orbital energies of the central metal atom/ion. The splitting of the d-orbitals provides different electronic arrangements in strong and weak crystal fields.

12 What is the IUPAC name of the coordination compound, $K_3 [Cr (C_2O_4)_3]$? 1 M

13 What is the oxidation state of Pt in $[Pt (NH_3)_2 Cl (NH_2CH_3)] Cl$ 1 M

14 Calculate the number of unpaired electron(s) in $[Mn (CN)_6]^{4-}$. 1 M

15 What is the shape and hybridisation of Ni in $[Ni (CN)_4]^{2-}$? 2 M

OR

Draw the diagram of d-orbital splitting in an octahedral crystal field.

2 M