CLASS – XII (2019-20)

CHEMISTRY GUESS PAPER

HALF YEARLY EXAMINATION

Time: 3 hrs. **M. Marks: 70**

General Instructions

(a) All questions are compulsory.

(b) Section A: Q. no. 1 to 20 are very short answer questions (objective type) and carry 1 mark each.

(c) Section B: Q. no. 21 to 27 are short answer questions and carry 2 marks each.

(d) Section C: Q. no. 28 to 34 are long answer questions and carry 3 marks each.

(e) Section D: Q. no. 35 to 37 are also 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 two marks, two 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 log tables if necessary, use of calculators is not allowed.

SECTION – A

Read the given passage and answer the questions 1 to 5 that follow:

A battery is basically a galvanic cell in which the chemical energy of a redox reaction is converted to electrical energy. They are of mainly two types – primary batteries and secondary batteries.

(1) In which cell, Anode is zinc – mercury amalgam and cathode is a paste of HgO and carbon.

(2) Which cell shows the reaction:

$$Cd\,(s)+2Ni(OH)_3\,(s) \rightarrow CdO\,(s)+2Ni(OH)_2\,(s)+H_2O(l)$$

(3) Which cell is used in the Apollo space programme?

(4) What is the cathodic reaction of Dry Cell?

(5) In which cell, The space between the electrodes is filled by a moist paste of ammonium chloride (NH_4Cl) and zinc chloride ($ZnCl_2$).

Questions 6 to 10 are one word answers:

(6) Name the substance used as depressant in the separation of two sulphide ores in Froth floatation method.

(7) Name the unit formed by the attachment of same type of ligands in a coordination compounds.

(8) Regular decrease in the atomic and ionic radii along lanthanide series (though very slightly) is called:

(9) What type of reaction occurs in the formation of Arsenic Sulphide colloidal solution?

(10) Write the process name in which conversion of a freshly prepared precipitate into a colloidal sol by

shaking it with suitable dispersion medium in the presence of small amount of electrolyte occur.

Questions 11 to 15 are multiple choice questions:

(11) Among the following, which is not a colligative property?

a) Osmotic pressure b) Elevation of boiling point

c) Vapour pressure d) Depression of freezing point

(12) $KMnO_4$ acts as an oxidizing agent in alkali medium when alkaline $KMnO_4$ is treated with KI, iodide ions is oxidized to _____

a) I_2 b) IO^-

c) IO_3^- d) IO_4^-

(13) The protecting power of lyophilic colloidal sol is expressed in terms of:

(a) Coagulation value (b) Gold number

(c) Critical micelle concentration (d) Oxidation number

(14) The function of fluorspar in the electrolytic reduction of alumina dissolved in fused cryolite (Na_3AlF_6) is:

(a) As a catalyst

(b) To lower the temperature of the melt and to make fused mixture very conducting

(c) To decrease the rate of oxidation of carbon at the anode

(d) None of the above

(15) Among the following compounds, which on heating do not produce N_2?

(a) $(NH_4)_2Cr_2O_7$ (b) $NH_4Cl+NaNO_2$

(c) $NH_4Cl+CaO$ (d) $Ba(N_3)_2$

Questions 16 to 20:

(A) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(C) Assertion is correct, but reason is wrong statement.

(D) Assertion is wrong, but reason is correct statement.

16. **Assertion :** Molarity of a solution in liquid state changes with temperature.

Reason : The volume of a solution changes with change in temperature.

17. **Assertion:** Cu is less reactive than hydrogen.

Reason: $E^{\ominus}_{Cu^{2+}/Cu}$ is negative.

18. **Assertion:** Order of the reaction can be zero or fractional.

    Reason: We cannot determine order from balanced chemical equation.

19. **Assertion:** Linkage isomerism arises in coordination compounds containing ambidentate ligand.

    Reason: Ambidentate ligand has two different donor atoms.

20. **Assertion:** Separation of Zr and Hf is difficult.

    Reason: Because Zr and Hf lie in the same group of the periodic table.

SECTION: B

21. Calculate the number of lone pairs on central atom in the following molecule and predict the geometry. XeF_4

22. The effect of temperature on rate of reaction is given by Arrhenius equation.

    i) Write Arrhenius equation.

    ii) Define activation energy (Ea)

23. a) Represent the galvanic cell based on the cell reaction given below:

    $Cu(s) + 2\ Ag^+(aq) \longrightarrow Cu^{2+}(aq) + 2\ Ag(s)$

    b) Write the half cell reactions of the above cell.

24. Draw one of the geometrical isomers of the complex $[Zn(en)_2Br_2]$ which is optically inactive. Also write the name of this entity according to the IUPAC nomenclature.

25. (a) Draw the structure of $H_2S_2O_7$.

    (b) Write the preparation methods of potassium dichromate. Write balanced chemical equation.

    OR

    (a)Which allotrope of sulphur is thermally stable at room temperature?

    (b) Write the chemical equation for manufacture of Nitric acid by contact process.

26. What is meant by Vapour phase refining? Write the method(s) name, chemical equation with one example of the process which illustrates this technique, giving the chemical equations involved.

    OR

    Metals are extracted from their chief ore.

    a) Name the principal ore of Zinc.

    b) Write the equation for the reactions taking place Leaching process during the extraction of aluminium.

27. Draw a diagram depicting crystal field splitting in an octahedral environment of d-orbitals. Label the diagram properly. Calculate the crystal field stabilization energy for a d^4 configuration.

OR

The magnetic behaviour of a complex can be explained on the basis of Valence Bond (V.B.) theory.

a) $[Co(NH_3)_6]^{3+}$ is a diamagnetic complex and $[CoF_6]^{3-}$ is a paramagnetic complex. Substantiate the above statement using V.B. theory.

b) Write the IUPAC name of the complex $K_3[Cr(C_2O_4)_3]$

SECTION: C

28. Calculate the boiling point of a solution containing 0.8 g KCl (Molar mass = 74.5 g/mol) dissolved in 150 g water, (K_b of water = 1.86 K kg / mol).

29. For the reaction A + B → products, the following initial rates were obtained at various given initial Concentrations.

S. No.	[A] mol / L	[B] mol / L	Initial rate M/s
1.	0.1	0.1	0.05
2.	0.4	0.1	0.10
3.	0.1	0.4	0.05

Determine the half-life period.

OR

i) Derive an expression for half life period of first order reaction.

ii) A first order reaction has a rate constant 1.15×10^{-3} s^{-1}. How long will 5 g of the reactant take to reduce 3g?

30. Define the following:

(a) Associated colloids

(b) Electrophoresis

(c) Zeta potential

31. Give reasons for the following:

(i) Above 1000 K sulphur shows paramagnetism.

(ii) Although electron gain enthalpy of fluorine is less negative than that of chlorine, yet flourine is a better oxidising agent than chlorine.

(iii) In solid state PCl_5 exists as an ionic compound.

32. Identify the product formed when dilute and concentrated HNO_3 is treated with zinc and copper. Write the reason why Cr and Al do not dissolve in concentrated nitric acid.

33. (a) Write the difference between White and Black Phosphorus.

(b) Draw the labelled diagram of Tyndall effect.

OR

Complete the Reactions:

(i) $XeF_4 + O_2F_2 \longrightarrow$

(ii) $Cr_2O_7^{--} + H^+ + Fe^{++} \longrightarrow$

(iii) $MnO_4^- + OH^- + I^- \longrightarrow$

34. Write the short note on:

(a) Contact Process

(b) Hall–Héroult process

SECTION: D

35. (a) The vapour pressure of pure water 25°C is 23.76 torr. What is the vapour pressure of 100 gm of water to which 100 gm of $C_6H_{12}O_6$ (glucose) has been added ?

(b) Describe the preparation of Potassium dichromate .How does dichromate solution react to

(i) Nitrite ion (ii) Iron (II) ion

Write ionic equation for the reaction.

OR

(a) On doubling the initial concentration, $t_{1/2}$ of a reaction doubles, what is the order of reaction.

(b) On dissolving 3.24 g of sulphur in 40 g of benzene, boiling point of solution was higher than that of benzene by 0.81K (Kb = 2.53 K kg mol-1). What is molecular formula of sulphur? (Atomic mass of S = 32 g mol-1)

36. (a) A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed.

(b) What are the consequences of Lanthanide contraction?

(c) Suggest two materials other than hydrogen that one be used as fuels in fuel cell.

37. (a) Write the short note on:

(i) Emulsion

(ii) Kraft Temperature

(iii) Rhombic Sulphur

(b) (i) suggest a list of metals that are extracted electrolytically.

(ii) Write the role of collector in froth floatation method.

OR

(a) Give the difference between physisorption and chemisorption.

(b) (i) What is the hypertonic solution.

(ii) What is ultra filter?

(iii) Explain Hardy Schulze Law in term of colloidal particle.