JAIN COLLEGE

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Date: 2019-2020   *SUBJECT: CHEMISTRY*

I PUC
Mock paper

Timings Allowed: 3 Hrs15Minutes.   *Total Marks: 70*

Instructions:
1.   The question paper has FOUR parts A , B ,C and D. All parts are compulsory.
2.   Write balanced chemical equations and draw labelled diagram wherever required.
3.   Use log tables and the simple calculator if necessary.

PART A

I. Answer all the following.   **10 x 1 = 10**
1.   Which alkali metal is strongest reducing agent?
2.   State Charle's law.
3.   Write the IUPAC name of the element with atomic number 105.
4.   Define entropy.
5.   What is the oxidation number of **S** in H_2SO_4.
6.   Define standard enthalpy of vaporization.
7.   Define electronegativity.
8.   Name the gas liberated at anode during the preparation of NaOH.
9.   How many significant figures are there in 1000?
10. Among eclipsed and staggered conformers of ethane which is more stable?

PART B

II. Answer any FIVE of the following.   **5 x 2 = 10**
11.   Write any two postulates of Dalton's atomic theory.
12.   Derive ideal gas equation.
13.   Write any two Fajans rule for determination of covalent character in ionic bond.
14.   How is caustic soda manufactured?
15.   Write the anomalous properties of lithium.
16.   Explain the preparation of cis - alkene from alkyne.
17.   Explain aromatization reaction with an example.
18.   Write a note on soil pollution.

PART C

III. Answer any FIVE of the following.   **5 x 3 =15**
19.   Define ionization enthalpy .How does it vary along the period and down the group?
20.   What is hydrogen bonding? Give its classification.
21.   (a)Discuss the shape of NH_3 molecule using VSEPR theory.
        (b)Write Lewis dot structure of O_3 molecule.
22.   (a)How diborane is prepared in the laboratory.
        (b) How do you prepare produce gas?
23.   Balance the redox reaction by oxidation number method
        $MnO_4^-(aq) + Br^-(aq) \longrightarrow MnO_2(s) + BrO_3^-(aq)$ (basic medium)
24.   (a)How is demineralized water prepared?
        (b) How is permanent hardness of water is removed by Calgon's method?

25. What is diagonal relationship? Explain the diagonal relationship between Li and Mg.

26. (a) Explain the reaction of diborane when it is exposed to air. Give equation.

(b) What is the shape of C_{60} molecule?

PART D (IV and V)

IV. Answer any FIVE of the following   **5 x 5 = 25**

27. (a) A compound contains 6.7% hydrogen, 39.9% carbon and rest is oxygen. Its molar mass is 60g what are its empirical and molecular formula?

(b) Define the term molarity.   (4+1)

28. (a) Give the postulates of Rutherford's model of an atom.

(b) State Pauli's exclusion principle.   (3+2)

29. (a) Name the four quantum numbers and mention what they indicate.

(b) Calculate the wave length of spectral line of shortest wavelength appearing in the Balmer series of hydrogen spectrum. (Given $R = 1.09 \times 10^{-7}$ m^{-1}) .   (3+2)

30. (a) Why do real gases deviate from ideal behavior?

(b) Write the mathematical expression for compressibility factor.

(c) Define Boyle's temperature.   (2+2+1)

31. (a) Give the Born –Haber cycle for the lattice enthalpy of formation of NaCl.

(b) State the III- law of thermodynamics.

(c) What is the sign of ΔG for any spontaneous process?   (3+1+1)

32. (a) Show that $Cp-Cv=R$.

(b) The enthalpy of combustion of methane, graphite and dihydrogen at 298 K are -890.8 kJ/mol, -393.5 kJ/mol and 285.8 kJ/mol respectively. Calculate the enthalpy of formation methane. (2+3)

33. (a) One mole of N_2 and 3 moles of H_2 are mixed in a closed vessel of 1dm^3 capacity. At equilibrium if the vessel contains the total of 2.4 moles calculate the equilibrium constant Kc for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$.

(b) Define common –ion effect.   (4+1)

34. (a) State Le-chatelier's principle. What is the effect of temperature and pressure on the reaction? $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ $\Delta H=$-ve.

(b) Define buffer solution. Give an example of acidic buffer.

V. Answer any TWO of the following.   **2 x 5 = 10**

35. (a) Give any two differences between inductive and electromeric effect.

(b) How do you estimate the percentage of **C** and **H** present in the organic compound? (2+3)

36. (a) Explain functional isomerism with an example.

(b) Explain the free radical mechanism of chlorination of methane.   (2+3)

37. (a) Explain the mechanism of sulphonation of benzene.

(b) Explain Friedel- Crafts reaction with an example.   (3+2)

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