



JAIN COLLEGE

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Bangalore - 560 098

Date:

SUBJECT: CHEMISTRY

**I PUC
Mock paper**

Timings Allowed: 3 Hrs 15 Minutes.

Total Marks: 70

PART A

I. Answer all the following.

10 x 1 = 10

1. Which alkali metal is strongest reducing agent
2. Which compound is called inorganic benzene
3. Write the IUPAC name of the element with atomic number 105
4. Which compound is called inorganic benzene
5. What is the oxidation number of sulphur in H_2SO_4
6. State standard enthalpy of combustion
7. State Mendeleev's periodic law.
8. Define ionization enthalpy
9. Name the gas liberated at anode during the preparation of NaOH.
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. State Boyle's law. Give its mathematical form.
13. Define dipole moment and mention its unit.
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 atomic radius. How does it vary down the group and down the period?
20. What is hydrogen bonding give its type.
21. Discuss the shape of NH_3 molecule.
22. Is it He_2 exists justify your answer?
23. Balance the following reaction by oxidation number method.
 $Cr_2O_7^{2-} + SO_3^{2-} (aq) \text{ ----- } Cr^{3+} (aq) + SO_4^{2-} (aq)$ (acidic medium)
24. (a) Water is amphoteric in nature . Justify.
(b) Mention any one use of H_2O_2 .
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 its 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 compound contains 6.7% hydrogen, 39.9% carbon and rest is oxygen .its molar mass is 60 g what are its empirical and molecular formula?
(b) Define mole . (4+1)
28. (a) Explain Rutherford's alpha ray scattering experiment.
(b) Write the differences between orbit and orbital. (3+2)
29. (a) Write the postulates of Planck's quantum theory.
(b) Calculate the wave length of spectral line of shortest wavelength appearing in the Balmer series hydrogen spectrum. (given $R = 1.09 \times 10^{-7} \text{ m}^{-1}$) (3+2)
30. What are the conditions under which real gases deviates from ideal behavior?
(b) Write the mathematical expression for compressibility factor.
(c) Calculate the value of R for one mole of an ideal gas in S.I units. (2+2+1)
31. (a) State I law of thermodynamics. Give its mathematical form.
(b)Equilibrium constant of a reaction is 0.008 calculate the standard Gibb's energy change at 298 K. (2+3)
32. (a) Show that $C_p - C_v = R$.
(b) CO is allowed to expand isothermally and reversibly from 10 m^3 to 20 m^3 at 300 K and work obtained 4.754 k J. So calculate number moles of CO. (3+2)
33. (a) One mole of N_2 and 3 moles of H_2 are mixed in a closed vessel of 1 dm^3 capacity. At equilibrium if the vessel contains the total of 2.4 moles calculate the equilibrium constant K_c for the reaction $\text{N}_2 + 3\text{H}_2 \leftrightarrow 2\text{NH}_3$
(b) Write the conjugate base of NH_4^+ . (4+1)
34. (a) What is the ionic product of water ? Give its value at 298 K
(b) The concentration of H^+ in a sample of soft drink is $3.8 \times 10^{-3} \text{ M}$. What is its pH?
(c) Give Henderson's equation for acidic buffer. (2+2+1)

V. Answer any TWO of the following.

2 x 5 = 10

35. (a) Write the principle involved in the estimation of carbon and hydrogen ? give diagram and calculation
(b) Explain -I effect with an example. (3+2)
36. (a) Define chain isomerism with an example.
(b) How do you convert ethyne to benzene?
(c) How do you detect presence of nitrogen organic compound? (1+2+2)
(a) Explain the mechanism of nitration of benzene.
(b) How are alkanes prepared by Wurtz reaction? (3+2)
