JAIN COLLEGE

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Bangalore - 560 098

Date: *SUBJECT: CHEMISTRY*

I PUC
Mock paper

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

PART A

I. Answer all the following.   **10 x 1 = 10**
1. State law of definite proportions.
2. What is an isotherm?
3. State standard enthalpy of combustion.
4. State Mendeleves periodic law.
5. Define reduction.
6. Name the gas liberated at anode during the preparation of NaOH.
7. Give the formula of inorganic benzene.
8. Define ionization enthalpy.
9. How many sigma and pi bonds are present in $CH_3-CH=CH_2$?
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 boron.
16. Explain the preparation of cis - alkene from alkyne.
17. Explain aromatization reaction with an example.
18. Write a note on depletion of ozone layer.

PART C

III.Answer any FIVE of the following.   **5 x 3 =15**
19. Define atomic radius. How does it varies down the group and across the period?
20. Write a note on hydrogen bonding.
21. Discuss the shape of $BeCl_2$ using VSEPR theory.
22. What are the conditions for the Linear Combination of Atomic Orbitals?
23. Balance the following reaction by oxidation number method.

   $Cr_2O_7^{2-} + SO_3^{2-}{}_{(aq)}$ ------------- $Cr^{3+}{}_{(aq)} + SO_4^{2-}{}_{(aq)}$ (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 Be and Al.
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 4.07% hydrogen, 24.77% carbon and 71.65% chlorine .its molar mass is 98.96 g what are its empirical and molecular formula?
    (b) Define molarity.   (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 = 1.09×10^{-7} 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 Cp-Cv=R.
    (b) CO is allowed to expand isothermally and reversibly from 10 m^3 t0 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 1dm^3 capacity. At equilibrium if the vessel contains the total of 2.4 moles calculate the equilibrium constant Kc for the reaction $N_2 + 3H_2 \leftrightarrow 2NH_3$
    (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 3.8×10^{-3} M. What is its pH?
    (c) Give Henderson's equation.   (2+2+1)

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

35. (a) How are halogens present in an organic compound estimated by Carius method?
    (b) Explain –I effect with an example.   (3+2)

36. (a) Define position isomerism with an example.
    (b) How are organic compounds classified?
    (c)What is type of hybridization of Carbon in $CH_2=CH_2$?   (2+2+1)

37. (a)Explain the mechanism of chlorination of methane.
    (b)How are alkanes prepared by Wurtz reaction?   (3+2)

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