



JAIN COLLEGE, J C Road Bangalore  
Mock Paper February - 2015  
I PUC – Chemistry (34)

Time: 3 Hours 15 Minutes

Max. 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 diagrams wherever required.
3. Use log tables and the simple calculator if necessary. (Use of scientific calculators is not allowed).

**PART –A**

- I. **Answer all the questions. Each question carries one mark.** **1 x 10 =10**
1. How many significant figures are there in 0.046?
  2. Two gases A and B have critical temperatures 260 K and 130 K respectively. Which of these can be liquefied more easily?
  3. When does a salt get precipitated in solution?
  4. What are isoelectronic ions?
  5. Identify the type of redox reaction.  $2 \text{NaH(s)} \rightarrow 2 \text{Na (s)} + \text{H}_2\text{(g)}$ .
  6. Name the alkali metal used in photoelectric cells.
  7. Give the composition of water gas.
  8. Write the molecular formula of inorganic benzene.
  9. Write the IUPAC name of  $\text{CH}_3\text{-CH=CH-CH=CH}_2$ .
  10. How will you prepare alkenes from vicinal dihalides?

**PART – B**

- II. **Answer any five questions. Each question carries two marks.** **2 x 5 =10**
11. Calculate the mass of oxygen required by an astronaut for one day if he requires the energy released by the burning of 34 g of sucrose for one hour.  $\text{C}_{12}\text{H}_{22}\text{O}_{11} + 2 \text{O}_2 \rightarrow 12 \text{CO}_2 + 11 \text{H}_2\text{O}$  (Molar mass of sucrose= 342).
  12. Define surface tension. Mention the factors that affects surface tension.
  13. Write the electronic configuration of lithium molecule and calculate its bond order.
  14. What happens when water is dropped on quick lime?
  15. What happens when orthoboric acid is heated above 370 K? Write the equation?
  16. Explain Friedel Craft's alkylation reaction.
  17. How is ethane prepared from ethyne?
  18. Define Biochemical oxygen demand. What is its significance?

**PART- C**

- III. **Answer any five questions. Each question carries three marks.** **3 x 5 = 15**
19. i) Explain the term covalent radius.  
ii) Write the general electronic configuration of *d*- block elements. (2+1)
  20. On the basis of VSEPR theory, explain the structure of water molecule.
  21. i) Write any two differences between sigma and pi bonds.  
ii) How many sigma and pi bonds are there in acetylene? (2+1)
  22. Write any three features of hybridisation.
  23. Balance the following redox reaction by the half- reaction method.  
 $\text{Cr}_2\text{O}_7^{2-} + \text{Fe}^{2+} + \text{H}^+ \rightarrow \text{Cr}^{3+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
  24. What are the advantages and limitations of using hydrogen as a fuel?
  25. i) With an equation explain what happens when diborane is exposed to air.  
ii) Name the metal present in group 14. (2+1)
  26. i) What is inert pair effect?  
ii) How does aluminium react with NaOH solution? Give equation. (2+1)

### PART -D / D1

#### IV. Answer any five questions. Each carries five marks.

5 x 5 =25

27. i) 50.0 kg of N<sub>2</sub> and 10.0 kg of H<sub>2</sub> are mixed to prepare NH<sub>3</sub>. Calculate the amount of NH<sub>3</sub> formed. Identify the limiting reagent.  
ii) Define mole fraction. (3+2)
28. i) State Heisenberg's uncertainty principle. Give its mathematical expression.  
ii) Write any two differences between orbit and orbital.  
iii) What are isotopes? (2+2+1)
29. Give the expression for the wave number of spectral lines in Hydrogen spectra. With the help of equation explain the different series of lines.  
ii) Write the limitations of Bohr's atomic model. (3+2)
30. i) State and explain Dalton's law of partial pressures with its mathematical expression.  
ii) Why do real gases deviate from ideal behaviour? (3+2)
31. i) Write the Gibbs equation. Give the criteria for the spontaneity of a reaction in terms of change in free energy.  
ii) Define standard enthalpy of combustion. Give an example. (3+2)
32. i) Two litres of an ideal gas at a pressure of 10 atmosphere expands to a final volume of 10 litres in a reversible process. How much heat is absorbed in the expansion?  
ii) State Hess's law of constant heat of summation. (3+2)
33. i) Show that pH + pOH = pkw.  
ii) Define Lewis acids and bases with examples. (3+2)
34. i) For the equilibrium 2NOCl (g)  $\rightleftharpoons$  2 NO(g) + Cl<sub>2</sub>(g) the value of equilibrium constant is K<sub>c</sub> = 3.75 x 10<sup>-6</sup> at 1069 K. Calculate K<sub>p</sub> for the reaction at this temperature.  
ii) State and explain law of mass action. (3+2)

### PART -D / D2

#### V. Answer any two questions. Each question carries five marks.

2 x 5 = 10

35. i) With a neat diagram explain the Leibig's method for the estimation of carbon and hydrogen in an organic compound.  
ii) Explain simple distillation. (3+2)
36. i) What is functional isomerism? Give example.  
ii) Explain +I and - I effect with examples.  
iii) Which element is estimated using Kjeldahl's method? (2+2+1)
37. i) Explain the mechanism of chlorination of methane.  
ii) Write the reactions when a) Vapours of ethyne are passed through red hot copper tubes.  
b) Chlorine is passed through benzene in the presence of sunlight and absence of halogen carrier. (3+2)

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