



JAIN COLLEGE, Bangalore  
Mock Paper December - 2017  
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 the parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever required.
3. Use log tables and simple calculators if necessary (Use of Scientific calculator is not allowed)

**PART – A**

**I. Answer all the following questions: 10 × 1 = 10**

1. What is the S.I unit of density?
2. What is Boyle temperature?
3. State Henry's law.
4. On what parameter elements are classified in the modern periodic table?
5. Give an example for a compound in which oxygen has +2 oxidation state.
6. Name the alkali metal used in photoelectric cells.
7. Name the allotrope of carbon which conducts electricity.
8. What is the repeating unit in organosilicon polymer?
9. What are carbanions? Give example.
10. Name the product formed when sodium acetate is fused with soda lime.

**PART – B**

**II. Answer any FIVE of the following questions. 5 × 2 = 10**

11. State the law of multiple proportion.
12. Draw the plot of P vs V to show the deviation of real gas from ideal behaviour.
13. Dipole moment in BF<sub>3</sub> molecule is zero. Give reason.
14. What happens when sodium metal is heated in air? Give equation.
15. Draw the structure of diborane.
16. How do you convert ethene to ethane? Write the equation.
17. Sodium salt of which acid will be needed for the preparation of ethane? Write the chemical equation for the reaction.
18. Name two major contributors of acid rain.

**PART – C**

**III. Answer any FIVE questions 5 × 3 = 15**

19. a) How does atomic radii vary in a period? (1+1+1)  
b) Write the IUPAC name of the element with atomic number 108.  
c) What are isoelectronic ions?
20. Give any three postulates of molecular orbital theory. (3)
21. Explain the sp<sup>2</sup> hybridisation in BCl<sub>3</sub> molecule. (3)
22. Define octet rule and draw the Lewis structure for the following molecules. (3)  
i) H<sub>2</sub>S      ii) BeF<sub>2</sub>
23. Explain the redox reaction of  $2\text{Cu}_2\text{O}_{(s)} + \text{Cu}_2\text{S} \rightarrow 6\text{Cu}_{(s)} + \text{SO}_{2(g)}$  (3)
24. a) What is meant by "100 volume" of hydrogen peroxide? (1+1+1)  
b) What is syn gas?  
c) Among the isotopes of hydrogen, Which one is radioactive?
25. a) What is slaking of lime? (1+2)  
b) Mention any two biological importance of magnesium and calcium.
26. a) How does Aluminium react with dilute HCl? Give the equation. (2+1)  
b) Which allotrope of carbon has soccerball structure?

**PART – D**

**IV. Answer any FIVE of the following questions:**

**5 × 5 = 25**

27. a) Determine the empirical formula of an oxide of iron which has 69.9% iron and 30.1% oxygen by mass. Given the atomic mass of Fe=55.85, Oxygen=16. (3+2)  
b) Write any three postulates of Dalton's atomic theory.
28. a) Write any two limitations of Rutherford model. (2+2+1)  
b) Write the Rydberg equation and mention the region in which Lyman and Paschen series appears?  
c) State Aufbau principle.
29. a) Name the quantum number that specifies i) Size of an orbital ii) Shape of an orbital  
b) Mention the shapes of s, p, d and f orbitals and write the electronic configuration of Cu<sup>+</sup> (atomic number of Cu=29) (2+3)
30. a) What is the mathematical expression of compressibility factor? How it varies with pressure? (3+2)  
b) Define i) Aqueous tension ii) viscosity
31. a) Write Born-Haber cycle for the lattice energy of NaCl. (3+2)  
b) Six moles of an ideal gas at 27°C is compressed at constant temperature isothermally and reversibly from a volume of 5 litres to 10 litres by slowly increasing external pressure. Calculate the maximum work done. (R=8.314 J/K/mol and log 2= 0.3010)
32. a) Describe the following briefly i) internal energy ii) isolated system iii) specific heat capacity. (3+2)  
b) What are thermochemical equations? Write thermochemical equation for the combustion of ethyl alcohol.
33. a) Define acid and base according to Lewis theory with examples. (3+2)  
b) How do the values of Q and K<sub>p</sub> help in predicting the direction of the equation?
34. a. Calculate the ionisation constant K<sub>b</sub> and PK<sub>b</sub>. Given that P<sup>H</sup> of 0.004M hydrazine solution is 9.7. (3+2)  
b. What happens to the P<sup>H</sup> of water on the addition of CH<sub>3</sub>COONa and why?

**V. Answer any TWO of the following**

**2 × 5 = 10**

35. a) Give the IUPAC names of (3+2)  
i) Cl<sub>2</sub>CH CH<sub>2</sub>OH ii) CH<sub>3</sub>CH(Cl)COOH iii)   
b) How is Nitrogen detected by Lassaigne's test?
36. a) Write the principle used in the estimation of carbon and hydrogen. Give the diagram and calculation. (4+1)  
b) Write the resonance structure of benzene.
37. a) Write the steps involved in the mechanism of sulphonation of benzene. (3+2)  
b) How is ethene converted to 1, 2 dichloroethane ?

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