

**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. Give the S.I. unit for luminous intensity.
2. State Boyle's law.
3. Write IUPAC name of the elements with an atomic number 114.
4. Define dipole moment.
5. Write the conjugate base for  $\text{HSO}_4^-$ .
6. What is the composition of water gas?
7. Which is the strongest reducing agent among alkali metals?
8. Name the allotropic form of carbon whose structure resembles soccer ball.
9. How many  $\sigma$  and  $\pi$  bonds are present in  $\text{CH}_3\text{OH}$ .
10. Name a suitable technique for separation of component from a mixture of calcium sulphate and camphor.

**PART – B**

**II. Answer any FIVE of the following questions.**

**5 × 2 = 10**

11. Calculate the molarity of NaOH in the solution prepared by dissolving it's 4g in enough water to form 250ml of the solution.
12. Distinguish between sigma and pi bonds.
13. Calculate the volume occupied by 8.8g of carbon dioxide at 31.1°C and 1 bar pressure.
14. How is hydrogen formed as a byproduct in the electrolysis of water?
15. Give any two reasons for the anomalous behavior of Berillium.
16. Write all the differences between Inductive effect and Electromeric effect.
17. What are silicones?
18. Name the gases responsible for green house effect.

**PART – C**

**III. Answer any FIVE questions**

**5 × 3 = 15**

19. a) State modern periodic law.  
b) Arrange the following in the increasing order of the Ionic size  $\text{Mg}^{2+}$ ,  $\text{O}^{2-}$ ,  $\text{Na}^+$  and  $\text{F}^-$  (1+2M)
20. Explain  $\text{SP}^3$  hybridisation with suitable example. (3M)
21. Write the electronic configuration of Helium molecule based on molecular orbital theory and calculate it's bond order. (3M)
22. a) Calculate the oxidation number of Cr in  $\text{K}_2\text{Cr}_2\text{O}_7$ .  
b) What is the oxidation state of a substance in the elemental state? (2+1M)
23. What happens :  
I. Mg is burnt in air  
II. Quick lime is heated with silica  
III. Chlorine react with slaked lime (3M)
24. Discuss any three uses of Aluminium. (3M)
25. a) How diborane is prepared in laboratory?

- b) Give the chemical formula of borazine. (2+1M)  
26. Give any three postulated of VSEPR theory (3M)

**PART – D**

- IV. Answer any FIVE of the following questions: 5 × 5 = 25**
27. a) Write any two limitations of Rutherford's model of an atom.  
b) Calculate the wave number of the shortest wave appearing in the Balmer's series of hydrogen spectrum. (Given  $R=1.097 \times 10^7 \text{M}^{-1}$ ) (2+3M)
28. a) A Carbohydrate contains 40% C, 6.73% H and 53.3% O. The molecular mass of the compound is 180. Determine its molecular formula.  
b) Define limiting reagent (4+1M)
29. a) Write the main postulates of Bohr's theory  
b) State and explain Heisenberg's theory (3+2M)
30. a) Write any four postulates of kinetic theory of gases.  
b) Define critical temperature of a gas (4+1M)
31. a) State first law of thermodynamics and write its mathematical expression.  
b) Explain closed system with example.  
c) Calculate the amount of work done by 2 moles of an ideal gas at 298K in a reversible isothermal expansion from  $10 \text{dm}^3$  to  $20 \text{dm}^3$ ? (2+1+2M)
32. a) Describe the characteristics of chemical equilibrium  
b) Write Gibb's equation and explain the terms (3+2M)
33. a) Explain Born-Haber cycle to calculate lattice energy of NaCl.  
b) State Pauli's exclusion principle (4+1M)
34. a) Calculate the PH of a buffer solution containing 0.1 mole of acetic acid and 0.15 mole of sodium acetate.  $K_a$  for acetic acid is  $1.75 \times 10^{-5}$   
b) Define ionic product of water? (3+2M)
- V. Answer any TWO of the following 2 × 5 = 10**
35. a) Explain the mechanism of hydrogen bromide added to propene.  
b) How is methane obtained from decarboxylation? (3+2M)
36. a) What is the principle in the estimation of halogens in an organic compound? Describe the process involved in the estimation.  
b) With a suitable example explain functional isomerism. (3+2M)
37. a) Explain the mechanism of nitration of benzene.  
b) How is an alkene prepared from vicinal dibromide. (3+2M)

\*\*\*\*\*

KARNATAKA BOARD 1<sup>st</sup> PUC MODEL PAPER – SET 2  
CHEMISTRY

