

**MALAPPURAM DISTRICT HIGHER SECONDARY CHEMISTRY TEACHERS  
ASSOCIATION**

**FIRST YEAR CHEMISTRY MODEL EXAMINATION**

Time: 2.15 Hour

Score: 60 Marks

*Answer any 8 questions from 1-11. Each carries 2 scores (8x2=16)*

1. There are many atomic models
  - a) Who proposed nuclear model of atom. (1)
  - b) Give one limitation of the above model. (1)
2. State modern periodic law. (2)
3. VSEPR theory gives idea about shape of molecules
  - a) The geometry of H<sub>2</sub>O molecule is..... (1)
  - b) Give an example for a molecule having octahedral geometry. (1)
4. Define Boyle Temperature. (2)
5. What you mean by an isolated system? Give an example. (2)
6. Write the expression for K<sub>c</sub> of the following reactions. (2)
  - a)  $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
  - b)  $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
7. Write any two limitations of octet rule. (2)
8. State Dalton's law of partial pressure. (2)
9. Define entropy and give its unit. (2)
10. Give the Arrhenius concept of acid and Base. (2)
11. Calculate the number of molecules present in 88g CO<sub>2</sub>. (2)

*Answer any 8 questions from 12-23. Each carries 3 scores (8x3=24)*

12. Atomic orbitals are distinguished by Quantum numbers.
  - a) Name the four quantum numbers. (2)
  - b) Represent the orbital n=1 and l=0 (1)
13. Write any three factors affecting ionization enthalpy. (3)
14. Polarity is related to shape of molecules
  - a) Define dipole moment. (2)
  - b) What is the dipole moment of BeCl<sub>2</sub> molecule? (1)

15. The spontaneity of a process is explained in terms of change in free energy.
- What is meant by Gibbs free energy? (2)
  - How standard free energy change is related to equilibrium constant. (1)
16. Le Chatelier principle is related to an equilibrium system
- State the above principle. (2)
  - What is the effect of pressure in the equilibrium system  

$$\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$$
 (1)
17. State Heisenberg's uncertainty principle and give its mathematical expression. (3)
18. Write the molecular orbital configuration of  $\text{O}_2$  molecule and give its magnetic behavior. (3)
19. Write any three postulates of kinetic molecular theory of gases. (3)
20. Give the differences between exothermic reactions and endothermic reactions. (3)
21. There are different types of acid base concepts. Briefly explain Lewis concept of acid and base with examples. (3)
22. A photon has mass of  $8.6 \times 10^{-30}$  Kg. Calculate its wave length  
 $[\text{h} = 6.626 \times 10^{-34} \text{ JS}]$  (3)
23. Compare the dipole moment of  $\text{NH}_3$  and  $\text{NF}_3$ . (3)

*Answer any 6 questions from 24-31. Each carries 4 scores each.  
 (5x4=20)*

24. Atomic spectrum is helpful for the structural studies
- Name the series of lines found in hydrogen spectrum. (2)
  - Calculate the wave Number of second line in Balmer series of hydrogen spectrum. (2)
25. Atoms can lose or gain electrons to get stability
- What you mean by an isoelectronic species? (2)
  - Arrange the following isoelectronic species based on their ionic radius.  
 $\text{Na}^+, \text{Mg}^{2+}, \text{O}^{2-}, \text{F}^-$  (2)
26. Hybridization is the factor which determine geometry of molecule.

- a) Define hybridization. (2)  
b) Find out the hybridization of H<sub>2</sub>O and SF<sub>6</sub>. (2)

27. Enthalpy is an extensive property.

- a) Give the difference between extensive properties and intensive properties. (2)  
b) Calculate the enthalpy of formation of carbon monoxide (CO) from the following data (2)



28. Buffer solutions are commonly used in laboratory

- a) What you mean by Buffer solutions? (2)  
b) Give any two examples of Buffer solutions. (2)

29. Electronic configuration is based on some rules and principles.

- a) Briefly explain Hund's rule of maximum multiplicity with example. (2)  
b) Write the stable electronic configuration of Cu and Cr. (2)

30. Weak electrolytes are partially ionisable.

- a) Give an example for a weak electrolyte. (1)  
b) Briefly explain common ion effect with example. (3)

31. We can predict the spontaneity of the reaction from free energy change.

- a) What you mean by a spontaneous process? Give an example. (2)  
b) The enthalpy and entropy changes of a reaction are 40.63 KJ mol<sup>-1</sup> and 108.8 JK<sup>-1</sup> mol<sup>-1</sup> respectively. Predict the feasibility or spontaneity of the reaction at 27°C. (2)