SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **I PUC Mock Question Paper**	**Course:**	I PUC
	Subject:	Chemistry
	Max. Marks:	70
	Duration:	3:15 hrs.

Instructions:

The question paper has five parts A, B, C, D_4 and D_5.

Write balanced chemical equations and neat labelled diagram wherever necessary.

Use log table and simple calculator for calculation.

PART-A

I **Answer all the questions.** **1 x 10 = 10**

1. Give the SI unit of luminous intensity.
2. Write van derWaal's equation for 'n' moles of a real gas.
3. Define electron gain enthalpy.
4. What is common ion effect?
5. Identify the reducing agent in the following reaction: $Zn + 2HCl \rightarrow ZnCl_2 + H_2$.
6. Write the electronic configuration of oxygen molecule based on molecular orbital theory.
7. Give an example of Zeolite.
8. Among –CHO and $–NH_2$, Which one exerts -M effect?
9. Write the formula of plaster of Paris.
10. Name the catalyst used to convert Ethyne to Ethene during reduction.

PART-B

II **Answer any five of the following** **2 x 5 = 10**

11. A sample of helium has a volume of $500cm^3$ at 373 K. Calculate the temperature at which volume becomes $260cm^3$ assuming pressure to be a constant. (R = 8.314 J/mol/K)
12. Bond angle of ammonia is greater than water. Give reason.
13. 1.02g of Mg is burnt in a closed vessel which contains 0.5g of oxygen. Identify the limiting reagent?
14. Arrange the following in the increasing order of their basic strength:
    $Ca(OH)_2$; $Sr(OH)_2$; $Be(OH)_2$; $Mg(OH)_2$.
15. Complete the following reaction.
    a) $2Al + 2NaOH + 6H_2O \rightarrow$
    b) $Fe_2O_3 + 3CO \rightarrow$
16. How is BHC prepared? Give equation.
17. Justify the oxidising nature of H_2O_2 in acidic and basic medium using suitable example.
18. How is 'ozone layer' formed in stratosphere? Which is the chief chemical responsible for ozone depletion?

PART-C

III **Answer any five of the following** **3 x 5 = 15**

19 a) Mention any two factors affecting ionisation enthalpy.
   b) What are isoelectronic species? (2+1)

20 Explain intermolecular and intramolecular hydrogen bonding using suitable example. (3)

21 a) Give the structure of diborane.
   b) Why CO is poisonous? (2+1)

22 Mention any three postulates of molecular orbital theory. (3)

23 Balance the following redox reaction by oxidation number method in basic medium.
$$MnO_4^-{}_{(aq)} + I^-_{(aq)} \rightarrow MnO_{2_{(s)}} + I_{2(g)}$$ (3)

24 a) How is caustic soda manufactured by Castner Kelner method?
   b) Give the reaction for the preparation of baking soda. (2+1)

25 a) How is temporary hardness removed by Clark's method?
   b) What is slaking of lime? (2+1)

26 Explain the structure of $BeCl_2$ based on the concept of hybridisation. (3)

PART-D_4

IV Answer any five of the following **5 x 5 = 25**

27 a) Mention any three postulates of Dalton's atomic theory.

b) Calculate the mass percent of Cu in $CuSO_4.5H_2O$. (At mass Cu = 63.5, O = 16, S = 32, H = 1) (3+2)

28 a) Mention the significance of principal, azimuthal and spin quantum number.

b) Calculate the de-Broglie wavelength of an electron travelling with a speed equal to that of light. ($c = 3 \times 10^8 ms^{-1}$; mass of electron = 9.1×10^{-31}kg : and h = 6.62×10^{-34} Js) (3+2)

29 a) A golf ball has mass of 40g and a speed of 45 m/s. If speed can be measured with 2% accuracy, calculate the uncertainty in its position. ($h = 6.62 \times 10^{-34}$ Js)

b) Mention any two drawbacks of Bohr's atomic model.

c) Write the electronic configuration of an atom whose mass number is 40 and number of neutrons in its nucleus is 20. (2+2+1)

30 a) Derive the relation between density and molar mass from ideal gas equation.

b) Mention the significance of compressibility factor.

c) What is the SI unit of surface tension? (2+2+1)

31 a) State Hess's law.

b) The equilibrium constant for a reaction is 10 at 300K. What will be the value of ΔG° at the same temperature? (R = 8.314 J/mol/K)

c) In a process 701 J of heat is absorbed by a system and 394 J of work is done by system. Calculate the change in internal energy? (1+2+2)

32 a) Calculate the standard enthalpy of combustion of methane from the following data.

$C_{(S)} + 2H_{2_{(g)}} \rightarrow CH_{4_{(g)}}; \Delta H = -17.9 kJ / mol$

$C_{(S)} + O_{2_{(g)}} \rightarrow CO_{2_{(g)}}; \Delta H = -94 kJ / mol$.

$H_{2_{(g)}} + \frac{1}{2} O_{2_{(g)}} \rightarrow H_2O_{(l)}; \Delta H = -68.4 kJ / mol$

b) Calculate the work done when 3 moles of an ideal gas expands isothermally and reversibly from 15L to 30L at 27° C. (3+2)

33 a) What are homogenous and heterogenous equilibria? Give example.

b) The solubility product of Ag_2CrO_4 is 2.5×10^{-12} at 298 K. Calculate its solubility. (3+2)

34 a) State Le-Chatelier's principle. What is the effect of increase in temperature on the equilibrium for the reaction ; $2NO_{2_{(g)}} \rightleftarrows N_2O_{4_{(g)}}; \Delta H = -57.2 kJ$.

b) What is buffer solution? Give an example for basic buffer. (3+2)

PART-D_5

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

35 a) Explain functional isomerism with an example.

b) Give all the equations involved in Lassaigne's test for the detection of nitrogen.

c) Name the method used to separate the liquids with smaller difference in boiling points. (2+2+1)

36 a) How do you bring about the following conversion?

i) ethanol to ethene.

ii) propyne to propanone.

iii) sodium benzoate to benzene.

b) Identify A and B in the following reaction.

$2C_2H_6 + 3O_2 \xrightarrow[-H_2O]{A, \Delta} 2CH_3COOH + NaOH \xrightarrow[\Delta]{B} CH_4 + Na_2CO_3.$ (3+2)

37 a) Explain the mechanism of Friedel-Craft acylation on benzene.

b) How is ethene prepared by β-elimination reaction? (3+2)

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