SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **MOCK QUESTION PAPER**	**Course:**	I PUC
	Subject:	**Chemistry**
	Max. Marks:	70
	Duration:	3:00

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 following. Each question carries one mark. 10 x 1 = 10

1 Give the SI unit for Luminous intensity.
2 Rise of a liquid in a capillary tube is due to which property?
3 Mention the condition for the precipitation of a salt.
4 Give an example for a Disproportionation reaction.
5 How does electronegativity vary down the group?
6 Arrange the following in the increasing order of their hydration enthalpies
K^+, Cs^+, Na^+, Li^+, Rb^+.
7 Write the chemical formula of inorganic benzene.
8 Give the repeating unit of silicones.
9 Mention the hybridisation of the third carbon atom in Hex – 1 – en – 4 – yne.
10 Which conformation of ethane has maximum torsional angle / dihedral angle?

PART-B

II Answer any FIVE questions. Each question carries two marks. 5 x 2 = 10

11 Density of 3M NaOH solution is 1.25 g mol^{-1}. Calculate the molarity of the solution.
12 56g of Nitrogen is mixed with 96g of oxygen. The total pressure of the mixture is 100 bar. Calculate the partial pressure of Nitrogen and Oxygen in the mixture.
13 Among $AlCl_3$ and AlF_3, which is more covalent and why?
14 Write the balanced chemical equation for the following:
i) Decomposition of lithium nitrate
ii) Solution of alkali metals in liquid ammonia
15 Give any two differences between graphite and diamond.
16 Complete the following reactions
i) $(CH_3)_3CH \xrightarrow[oxidation]{KMnO_4}$ _____
ii) $C_6H_6 + 3Cl_2 \xrightarrow[500k]{UV}$ _____
17 How is ethanal obtained from ethyne. Give reactions.
18 What is smog? How is classical smog different from photochemical smog.

PART-C

III Answer any FIVE question. Each question carries three marks. 5 x 3 = 15

19 a) Why first ionisation enthalphy of nitrogen is greater than that of oxygen?
b) Out of I, I^-, I^+, which has larger size? 2+1

20 a) With a suitable example give any one limitation of Octet rule.
b) Based on Molecular Orbital Theory, explain why He_2 is not formed. 1+2

21 Explain the formation of Ethyne based on hybridisation. 3

22 Explain the geometry of SF_4 and H_2O based on VSEPR Theory. 3

23 a) What type of reaction takes place at the cathode in an electrochemical cell?
b) Write the rules used to balance a chemical reaction by half-reaction method. 2+1

24 a) Give the electrode reactions for the electrolysis of brine solution.
b) Write any two differences between hard water and soft water? 2+1

25 a) How is quick lime prepared from $CaCO_3$? Give reaction.
b) How is sodium carbonate manufactured by Solvay's process? 2+1

26 a) Mention any two anomalous properties of carbon.
b) What is the action of alkali on aluminium? 2+1

PART-D$_4$

IV Answer any FIVE questions. Each question carries five marks 5 x 5 = 25

27 a) 50 kg of N_2 gas and 10 kg of H_2 gas are mixed to produce NH_3 gas. Calculate the amount of NH_3 formed and identify the limiting reagent in the reaction.
b) State Gay-Lussac's law of combining volumes.
c) Define mole. 3+1+1

28 a) Write the postulates of Bohr's theory.
b) What will be the wavelength of a ball of mass 0.1kg moving with a velocity of $10ms^{-1}$? 3+2

29 a) What is the value of 'l' for a double-dumbell shaped orbital?
b) The threshold frequency for a metal is $7.0 \times 10^4 s^{-1}$. Calculate the Kinetic energy of an electron emitted when radiation of frequency $\upsilon = 1.0 \times 10^{15} s^{-1}$ hits the metal.
c) Sketch the shape of d_z^2 and $d_{x^2-y^2}$ orbitals. 2+2+1

30 a) Explain dipole-dipole forces with suitable example.
b) Write the kinetic gas equation and explain the terms involved.
c) For hydrogen, Z>1, under all pressures. What does this signify? 2+2+1

31 a) Calculate the Gibb's free energy for conversion of oxygen to ozone
$\frac{3}{2}O_{2(g)} \rightarrow O_{3(g)}$ at 298K. If K_p is 2.47×10^{-29}. Predict the spontaineity of the reaction.
b) Write thermochemical equation for combustion of ethyl alcohol.
c) Define standard enthalpy of sublimation. 3+1+1

32 a) Explain Born-Haber's cycle for the formation of one mole of NaCl crystals.
b) State first law of thermodynamics and write its mathematical form. 3+2

33 a) Derive the relationship between Kp and Kc.
b) PCl_5 was heated in a closed 10L vessel at 250°C. At equilibrium, the vessel contains 0.1 mole of PCl_5, 0.2 mole of PCl_3 and 0.2 mole of O_2.
What is the equilibrium constant of the reaction?
c) Give an example for a reaction in heterogenous equilibrium. 2+2+1

34 a) Calculate the volume of 0.1M acetic acid solution to be mixed with $50cm^3$ 0.2M sodium acetate solution in order to prepare a standard buffer of pH 4.94 (pKa of acetic acid is 4.74)
b) Why is ammonia a bronsted base? Write its conjugate acid. 3+2

PART-D_5

V Answer any TWO question. Each carries five marks. 5 x 2 = 10

35 a) Define position isomers. Give the position isomer of pent-3-one.

b) Explain hyperconjugation with an example.

c) Give the composition of the blue complex formed during detection of Nitrogen by Lassaigne's test. 2+2+1

36 Describe the procedure, reaction, calculation involved in the estimation of Nitrogen by Kjeladahl's method. 5

37 a) Explain the mechanism involved in the addition of HBr with propene in presence of peroxide.

b) What are the two criteria for aromaticity of a molecule? 3+2

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