

I PUC CHEMISTRY (34)

Time: 3 Hrs.15Min

Blueprint for Chemistry Question Paper

Max. Marks: 70

Group	Unit	Name of Chapters	Teaching Hours	Marks	Part-A 20 x 1 Marks		Part B 8 x 2 Marks	Part C 8 x 3 Marks	Part D 11 x 5 Marks		Total
					I	II	III	IV	V	VI	
Group - I Physical	1	Some Basic Concepts of Chemistry	9	9	√	√	√		√		9
	2	Structure of Atom	10	10					√√		10
	5	States of Matter	9	8	√		√		√		8
	6	Thermodynamics	11	11	√				√√		11
	7	Equilibrium	13	12	√	√			√√		12
			52	50							50
Group-II Inorganic	3	Classification of elements and periodicity in properties	5	5	√	√		√			5
	4	Chemical Bonding and Molecular structure	12	12	√		√	√√√			12
	8	Redox reactions	5	4	√			√			4
	9	Hydrogen	4	4	√			√			4
	10	The s-Block elements	7	6	√		√	√			6
	11	The p-Block elements	8	8	√√	√	√	√			8
		Total of Group - II	41	39							39
Group - III Organic	12	Organic Chemistry: Some basic Principles and Techniques	12	12	√√					√√	12
	13	Hydrocarbons	12	11	√	√	√√			√	11
	14	Environmental Chemistry	3	3	√		√				3
		Total of Group - III	27	26							26
		Total	120	115	15	05	16	24	40	15	115

General Guidelines:

- (1) Questions should not be ambiguous, and answers should be available in prescribed textbook.
- (2) No application type of questions in Part A. All questions should be knowledge based and moderate.
- (3) In Part B, Part C and Part D, 40% questions knowledge based, 40% questions moderate and 20% questions skill and application type (difficult level).
- (4) Questions should be selected from respective chapters for particular question numbers as per blueprint.
- (5) Part A (I) MCQ questions from units 1 to 14 except chapter 2.
- (6) Part A (II) Fill in the blank's questions from Unit 1, 3, 7, 11 and 13.
- (7) For Part B, C and D, Previous years guidelines (before 2019) are applicable.

Government of Karnataka
Department of Pre-University Education
Model question paper
CHEMISTRY (34)

TIME: 3hours 15minutes

Maximum marks:70

Instructions: i. The question paper has four parts. All the four parts are compulsory

PART -A carries 20 marks, each question carries one mark.

PART- B carries 8 marks. Each question carries two marks

PART -C carries 12 marks. Each question carries three marks

PART-D carries 30 marks. Each question carries five marks

ii. Write balanced chemical equations and draw diagrams wherever necessary

Use log table and simple calculators if necessary (use of scientific calculator is not allowed)

PART-A

I. Select the correct option from the given choices.

1x15 = 15M

1. Scientific notation of 0.00506

- a) 5.06×10^3 b) 50.6×10^{-4}
c) 5.06×10^{-3} d) 0.506×10^{-2}

2. Mg^{2+} ion is isoelectronic with

- a) Ca^{2+} b) Na^+
c) Ne d) Kr

3. The molecule that has zero dipole moment

- a) $BeCl_2$ b) NH_3
c) $CHCl_3$ d) H_2O

4. The spherical shape of rain droplets is due to

- a) Viscosity b) Surface tension
c) Critical phenomenon d) Temperature

5. The entropy of the universe

- a) Increases and moves towards maximum value
b) Decreases and moves to zero
c) Remains constant
d) Decreases and increases with a periodic rate

6. The conjugate acid of O^{2-}
- a) O_2 b) O_2^{-1}
c) H_2O d) OH^-
7. The strongest reducing agent is
- a) K b) Mg
c) Al d) Br
8. The sum of the number of neutrons and protons in deuterium is
- a) 6 b) 2 c) 1 d) 3
9. Lithium shows diagonal relationship with
- a) Sodium b) Magnesium c) Calcium d) Aluminium
10. Inorganic benzene is
- a) $B_3H_3N_3$ b) $B_3N_3H_6$ c) $H_3B_3N_6$ d) BH_3NH_3
11. Which is not an allotrope of Carbon
- a) Graphite b) Diamond c) Fullerene d) Carborundum
12. The first organic compound synthesized in laboratory.
- a) Urea b) Ethylene
c) Methane d) Acetic acid
13. ortho and para nitrophenol can be separated by
- a) destructive distillation b) Steam distillation
c) azeotropic distillation d) Can't be separated
14. The number of σ and π bonds present in benzene is
- a) 12 and 3 b) 12 and 6 c) 6 and 6 d) 3 and 12
15. The region closest to earth's surface is
- a) Stratosphere b) Troposphere c) Mesosphere d) Thermosphere

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

[Heterogeneous, Ethyne, Homogeneous, Carbon monoxide, Fluorine] 1x5=5M

16. In a _____ mixture, the components completely mix with each other.
17. _____ is the most electronegative element.
18. A system having more than one phase is called _____ equilibrium.
19. Mixture of _____ and Nitrogen is called producer gas.
20. _____ on cyclic polymerization gives benzene.

PART-B

III. Answer any four of the following. Each question carries two marks.

2 x 4 = 8M

21. Define mole. Calculate the number of moles in 20g of NaOH.
22. Derive the relationship between density and Molar mass of a gaseous substance from ideal gas equation.
23. What is Hydrogen bonding? Give an example of a molecule which shows intramolecular H-bond.
24. Write the composition of
 - i. Plaster of paris.
 - ii. Washing soda.
25. How is diborane prepared in the laboratory?
26. Explain Wurtz reaction with suitable example.
27. Draw the cis and trans isomers of but-2-ene.
28. What is Smog? Name an oxide of Sulphur present in a classical smog.

PART -C

IV. Answer any four of the following. Each question carries three marks

4 x 3 = 12M

29. i. Define Ionization energy. How does it vary down the group (2+1)
 - ii. Write the IUPAC name of an element whose atomic number 106.
30. Explain the shape of NH₃ molecule based on VSEPR theory. (3)
31. Explain sp hybridization by taking BeCl₂ as an example. (3)
32. For Li₂ molecule: (1+1+1)
 - i. Write the electronic configuration
 - ii. Calculate its bond order.
 - iii. State its magnetic property.
33. Balance the following redox reaction by oxidation number method (3)
$$\text{MnO}_2 + \text{Br}^- \rightarrow \text{Mn}^{2+} + \text{Br}_2 \text{ (acid medium)}$$
34. i. What are Covalent hydrides? Give an example. (2+1)
 - ii. Name the isotope of hydrogen used in nuclear reactor.
35. i. Give any two reasons for the anomalous behavior of Beryllium. (2+1)
 - ii. Complete the reaction
$$2\text{Na} + \text{O}_2 \rightarrow \underline{\hspace{2cm}}$$
36. a) Write any two differences between graphite and diamond. (2+1)
 - b) Name the gas which forms complex carboxy haemoglobin.

PART-D

V. Answer any four of the following. Each question carries five marks. 4 x 5 = 20M

37. a) An organic compound contains 4.05% hydrogen, 24.26% carbon and 71.67% chlorine. Its molecular mass is 98.96. Find its empirical formula and molecular formula. [Atomic mass of H=1, C=12 and Cl=35.45] (4)
- b) Define molarity. (1)
38. a) Give any three postulates of Bohr's model of an atom.(3)
- b) i) State Pauli's exclusion principle.
- ii) Write the electronic configuration of Cr. [Atomic number of Cr =24] (1+1)
39. a) The green light has a wavelength of 535nm. Calculate the energy of a photon of green light. (2)
- b) Explain the significance of quantum numbers n, l and m_l. (3)
40. a) Write any three postulates of kinetic theory of gases. (3)
- b) Mention two conditions at which real gases approach ideal behavior. (2)
41. a) State first law of thermodynamics. Write its mathematical form in an adiabatic process. (2)
- b) Write Gibb's equation and mention any two thermodynamic criteria for a reaction to be spontaneous. (3)
42. a) The combustion of one mole of benzene takes place at 298K and 1 atm. After combustion, CO₂ and H₂O are produced and 3267.0 kJ of heat is liberated. Calculate the standard enthalpy of formation, Δ_fH⁰ of benzene. Standard enthalpies of formation of CO₂(g) and H₂O(l) are -393.5 kJmol⁻¹ and -285.83kJmol⁻¹ respectively. (4)
- b) Define entropy. (1)
43. a) State Le chatelier's principle. What is the effect of temperature onequilibrium?
- $$2\text{NO}_2 \rightleftharpoons \text{N}_2\text{O}_4 \quad \Delta H = -57.2 \text{ kJ} \quad (3)$$
- b) Define acid and base by the Lewis concept. (2)

44. a) Write the relationship between
- $[H_3O^+]$ and $[OH^-]$ for neutral solutions at 298K
 - Solubility and solubility product of AB type of salt. (2)
- b) What is buffer solution? Calculate the pOH of a solution obtained 0.05 M NH_4Cl is dissolved in 0.025 M NH_3 solution. (K_b for NH_3 is 1.77×10^{-5}) (3)

VI. Answer any two of the following. each question carries five marks **2 x 5 = 10M**

45. a) How carbon and hydrogen in organic compound are estimated by Liebig's method? (3)
- Give any two differences between inductive effect and resonance effect. (2)
46. a) Define functional isomerism. Do alcohols exhibit functional isomerism with ethers? (2)
- Give an example each: i) Neutral nucleophiles ii) Electrophiles (2)
 - Write the bond line structure of $CH_2=CH-CH=CH_2$ (1)
47. a) Explain the mechanism of chlorination of benzene. (3)
- Name the reagents used for the following conversions
 - But-2-yne to Cis but-2-ene
 - Chloroethane to Ethene (2)