

Dedication!**Determination!!****Distinction!!!****ACTC ADVANCED CHEMISTRY TUITION CENTRE, 41/1-PWD ROAD, NAGERCOIL-9940847892****DON'T STRESS!****DO YOUR BEST!!****FORGET THE REST!!!****+1 CHEMISTRY QUESTION BANK 2024-25****CLASS 11 CHEMISTRY VOL I & II****(WITH TEXT BOOK PAGE NUMBER)****Question Bank from**

- **GOVT PUBLIC EXAM PREVIOUS YEAR QUESTION PAPER - MARCH 2019(M19), JULY 2019 (J19), SEP2020 (S20), MAY 2022 (M22), JULY 2022(J22), MARCH 2023 (M23), JULY 2023 (J23), MARCH 2024 (M24), JULY 2024 (J24)**
- **GOVT MODEL QUESTION PAPER 2018-19 (GM19).**
- **Text book inside**

+1 CHEMISTRY GOVT PUBLIC PREVIOUS QUESTION PAPER ANALYSIS**+1 CHEMISTRY****M19 – MARCH 2019, J19-JULY 2019, S20- SEPTEMBER 2020, MAY 2022 (M22), JULY 2022 (J22)**

	MARCH 2019					JULY 2019					SEP 2020					SEP 2021				
	1M	2M	3M	5M		1M	2M	3M	5M		1M	2M	3M	5M		1M	2M	3M	5M	
LN1	1		1	1(2) 1(2)	8	1		1	1(2)	6	1	1		1(5)	8	2	1	1		7
2	1	1		1(3)	6	1	1C		1(3) 1(2)	8	1	1C	1	1(2)	8	-	1		1(2) 1(3)	7
3	1	1	1	1(3)	9	1		1	1(2)	6	1		1	1(3)	7	-		1	1(2) 1(3)	8
4	1		1	1(2)	6	1	1		1(3)	6	1	1	1	1(3)	9	1	1			3
5	1		1	1(3)	7	1	1	1	1(2)	8	1			1(3)	4	2			1(5)	7
6	1	1		1(2)	5	1	1	1	1(3)	9	1			1(2) 1(2)	5	1		1C P		4
7	1	1		1(3) 1(3)	9	1		1	1(2)	6	1	1	1	1(3) 1(2)	11	1	2		1(2) 1(3)	8
8	1		1	1(2)	6	1	1		1(3)	6	1	1		1(2)	5	1	1	1		6
9	1		1	1(3)	7	1		1	1(2) 1(3)	9	1		1	1(2)	6	1	1	1	1(5)	11
10	1	1	1	1(2)	8	1	1		1(3) 1(2)	8	1	1	1	1(3)	9	1		1	1(2) 1(3) 1(5)	14
11	1	2C	1C	1(2) 1(3)	11	1	1	1	1(2) 1(2)	10	1	1	1	1(2) 1(5)	13	2		1	1(2) 1(3)	10
12	1			1(3) 1(3)	7	1		1C	1(3)	7	-	1			2	1		1		4
13	1	1		1(2) 1(3)	8	1	1	1	1(3)	9	1		1	1(3) 1(2)	9	1	1C	1	1(2) 1(3)	11
14	1		1	1(3) 1(2)	9	1			1(3) 1(2)	6	2	1		1(5)	9	1	1		1(5)	9
15	1	1			3	1	1		1(2)	3	1		1	1(3)	7	REDUCED SYLLABUS				
	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110

MAY 2023 (M23), JULY 2023 (J23), MARCH (M24), JULY (J24), 2M- 2 marks; 2MC- 2 marks Compulsory; 3M- 3 marks; 3MC- 3 marks Compulsory; 5M- 5 marks; GM2M- Govt model question paper 2 marks; & PTA Questions

Inorganic UNIT 1,2,3,4,5	Physical Unit 6, 7,8,9,10	Organic Unit 11, 12, 13, 14,15
Part I Choose 5x1=5	Part I Choose 5x1=5	Part I Choose 5x1=5
Part II 3x2=6	3x2=6	3x2=6
Part III 3x3=9	3x3=9	3x3=9
Part IV 3x5=15	3x5=15	4x5=20
35	35	40

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LN	MARCH 2024 21-3-24					JULY 2022		JULY 2024 9-7-24			MARCH 2023 28-3-2023					MARCH 2025					JULY 2023 2-7-2023														
	1M	2M	3M	4M	5M	1M	2M	3M	4M	5M	6M	7M	8M	9M	10M	11M	12M	13M	14M	15M	16M	17M	18M	19M	20M	21M	22M	23M	24M	25M	26M	27M	28M	29M	30M
1	-	1	1		5	1	1	1		6	1bb	1	1	1(5)	11	1	1																	3	
2	1	1		1(3) 1(2)	8		1		1(3) 1(2)	7	1bb	1	1	1(3)	9	1	1			1(3) 1(2)														8	
3	-		1	1(5)	8	1		1	1(3) 1(2)	9	1bb		1	1(2)	6	1		1		1(5)														9	
4	1	1			3	1	1			3	1*		1	1(3)	7	1	1	1	1	1(3)														9	
5	2			1(3) 1(2)	7	2			1(5)	7	1bb	1		1(2)	5	1		1		1(2)													6		
6	2		1		5	1		1		4	1*		1		4	1	1	1		1(3)PR 1(2)													11		
7	1	2		1(5)	10	1	1 1C PR		1(3) 1(2)	10	1bb	1C Pr	1	1(5)	11	1	1			1(5)													8		
8	1	1	1C		6	1	1	1	1(5)	11	1bb	1		1(3)	6	1	1			1(3)													6		
9	1	1	1	1(5)	11	1	1	1		6	1bb	1		1(2)	5	1		1		1(2)													6		
10	1		1	2(5)	14	1		1	1(5) 1(5)	14	1bb	1		1(5)	8	1		1	1C	1(5)													12		
11	1		1	1(5)	9	2		1C	1(5)	10	1*		1C	1(3) 1(2)	9	1	1			1(5)													8		
12	2		1		5	1		1		4	1bb		1		4	1																	1		
13	1	1	1	1(5)	11	1	1	1	1(5)	11	1bb c	1		1(5)	8	1	1C	1		1(2)													9		
14	1	1C		1(5)	8	1	1		1(5)	8	1bb		1	1(3)	7	1	1			1(3)													6		
15	REDUCED SYLLABUS CORONA					REDUCED SYLLABUS CORONA					1bb	1	1(2)	5	1		1			1(3) 1(2)													9		
	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M	110

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LN 1	1bb Q6	1 bb Q28		1(3) BI	6	1bb	1bb	1bb	1(3) bb	9				
2	1bb Q11		1 bb Q32	1(2) BI	6	1bb	1bb		1(5) BI	8				
3	1bb Q14	1 bb Q29	1 bb Q40	1(2) BI	8	1bb		1bb	1(2) bb	6				
4	1bb Q2		1 BI	1(3) BI	7	1bb	1bb		1(5) bb	8				
5	1bb Q6	1 bb Q29 (v)		1(5) bb	8	1bb		1bb	1(3) bb	7				
6	1 BI pg173	1 BI		1(3) bb	6	1bb	1bb	1bb	1(2) bb	8				
7	1bb Q4		1 bb Q27	1(5) bb	9	1bb	1bb	1bb	1(2) bb 1(3) BI P	11				
8	1 BI Pg 7		1 BI	1(5) bb	9	1bb	1bb	1bb	1(5) bb	11				
9	1bb Q 10	1 Com pro		1(2) bb	5	1bb			1(3) bb	4				
10	1bb Q16	1 BI	1 bb Q32	1(5) bb	11	1bb		1bb C	1(2) bb	6				
11	1bb Q20	1 bb Q23		1(3) BI	6	1bb	1bb		1(5) bb	8				
12	1bb Q5		1 bb Q17	1(2) bb	6	1bb			1(2) bb	3				
13	1bb Q24	1 BI	1 Com	1(3) BI	9	1bb	1bb		1(3) bb	6				
14	1 BI Pg 249		1 BI	1(2) BI	6	1bb	1bb C	1bb	1(2) bb	8				
15	1bb Q4	1 BI		1(5) bb	8	1bb		1bb	1(3) bb	7				
	15	9	9	50M	110	15	9	9	50M	110	15	9	9	50M 110

Bb – book back bbc- book back small change *-inside

IMPORTANT QUESTION - QUESTION BANK-2025 +1

CHEMISTRY

LESSON 1 Basic Concepts of Chemistry and Chemical Calculations.

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24	M25
8	6	8	7	5	6	11	3	6	9	

- Define matter. Explain classification of matter. (2)
- Define relative atomic mass. (4) calculate relative atomic mass of hydrogen.
- Define average atomic mass. Find average atomic mass of chlorine. (4)
- Define relative molecular mass. **J24 2M**
- Find relative molecular mass of H₂, C₆H₁₂O₆, Ethanol..... (4,5)
- What do you understand by term mole. (6) (J19 2M, J23 2M, J24 5Mi)
- What is Avogadro number. (7)
- Define molar mass. Give an example. (8)
- Define molar volume. Give an example. (8)
- Define Gram equivalent mass. (8) **M22 2M, M24 2M**
- Calculate equivalent mass of acid.(H₂SO₄(**M19 3M**), HCl, H₃PO₄(**S20**))(9)
- Define basicity. Find the basicity of ortho-phosphoric acid. (9) **S20 2M**
- Calculate equivalent mass of base.(KOH, NaOH)(9)

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14. Calculate equivalent mass of Oxidising or reducing agent (KMnO_4) (9)
15. Define empirical formula & molecular formula. (10) Determination of Empirical formula, molecular formula **PROBLEMS & book back** (11)
16. What are the steps involving in the calculation of molecular formula from empirical formula? (10)
17. An acid found in tamarinds on analysis shows the following percentage composition: 32% Carbon, 4% Hydrogen, 64% oxygen. Find the empirical formula of the compound. (11)
18. An organic compound present in vinegar has 40% carbon, 6.6% of Hydrogen and 53.4 % of Oxygen. Find the empirical formula of the compound. (11) **(MQ19) M24 5Mi**
19. A compound having the empirical formula $\text{C}_6\text{H}_6\text{O}$ has the vapour density 47. Find its Molecular formula. **(M19 5Mi)** (BB34)
20. Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38% of hydrogen and rest oxygen. Its vapour density is 47. (BB34) **S20 5M, J22 3M**
21. Define stoichiometry. (13) & Calculations based on stoichiometry problems. (15)
22. Define Limiting reagent **J22 2M** & excess reagents. (17) problems (18)
23. One the formation of SF_6 by the direct combination of S and F_2 , which is the limiting reagent? Prove it.
24. Define redox reactions. (19)
25. Distinguish between oxidation and reduction. (19) **S21 3M, M23 2M**
26. What do you understand by the term oxidation number. (20) rules of oxidation number. (20) Oxidation number **problem** (21)
27. Calculate oxidation state of carbon in (i) CH_4 (ii) CCl_4 **(MQ19)**
28. Calculate oxidation number of oxygen in H_2O_2 . (21) **(M19 5Mi)**
29. Calculate the oxidation number of underlined elements. i) $\text{C}\underline{\text{O}}_2$ ii) $\text{H}_2\underline{\text{S}}\text{O}_4$ (21) **M22 3M**
30. Redox reactions in terms of oxidation numbers. (22)
31. What is combination reaction? Give example. (22)
32. What is decomposition reaction? Give two examples. (22)
- (Write the balanced equation for the action of heat on calcium carbonate. (22) **M24 2M) UNIT 5**
33. What is displacement reactions? Give its types. Explain with example. (23)
34. What is disproportionation reactions? Give example. (24)
35. What are competitive electron transfer reaction? Give example. (25)
36. What is the empirical formula of the following? BB (24) **S21 2M, J24 2M**
a) Fructose ($\text{C}_6\text{H}_{12}\text{O}_6$) b) Caffeine ($\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2$)
37. Balance the following equation using oxidation number method. (25)
 $\text{FeSO}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
 $\text{KMnO}_4 + \text{Na}_2\text{SO}_3 \rightarrow \text{MnO}_2 + \text{Na}_2\text{SO}_4 + \text{KOH}$ **M23 3Mi**
 $\text{Cu} + \text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{NO}_2 + \text{H}_2\text{O}$ **M23 3Mii**
38. Balance the following equation by oxidation number method. (26)
 $\text{MnO}_4^- + \text{Fe}^{2+} \rightarrow \text{Mn}^{2+} + \text{Fe}^{3+}$ (Acidic medium)
39. A Compound o analysis gave Na = 14.31 % S = 9.97% H = 6.22% and O = 69.5% calculate the molecular formula of the compound if all the hydrogen in the compound is present in

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combination with oxygen as water of crystallization. (molecular mass of the compound is 322).

BB **M23 5M****PREOBLEM-** Mole, molecular mass, equivalent mass, empirical formula, balance equation & study all book back question & answer**Lesson 2 Quantum Mechanical Model of Atom**

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
6	8	8	7	8	7	9	8	6	8				

- Write note on Thomson model of an atom. (39)
- Write note on Rutherford model of an atom. (39)
- Write note on Bohr atom model & limitation. (39) (write the assumptions of Bohr atom model)
J24 5M
- Derive De –Broglie equation.(40) **(M19 5Mii)**
- A macroscopic particle of mass one Kg is moving at a velocity 10 cms^{-1} . calculate its de Broglie wavelength. (41 model) **(MQ19)**
- Davison and Germer experiment. (42)
- Heisenberg uncertainty principle. (42) **S20 3M, J22 2M, M23 2M**
- Calculate the uncertainty in the position of an electron, if the uncertainty in its velocity is $5.7 \times 10^5 \text{ ms}^{-1}$. **(J19)**
- Explain briefly the time independent Schrodinger wave equation? (43)
- Explain main features of the quantum mechanical model of atom. (44)
- Explain different types of quantum numbers. (44) Principal quantum number **S21 5Mii, M23 3M**, Azimuthal quantum number **J23 5Mii**, Magnetic quantum number **J22 5Mi, J23 5Mi**, Spin quantum number. **M24 5Mii**
- Calculate the maximum number of electrons that can be accommodated in L shell. (44) **M22 2M**
- Define orbital? **J23 2M** what are the n and l values for $3p_x$ and $4d_{x^2-y^2}$ electron?(44) **(BBQ32 64)(J15), M24 3M**
- Calculate the orbital angular momentum for d and f orbital. (45) **(J15)**
- How many orbitals are possible for $n=4$? **(46) M22 5Mi, J24 2M**
- Shapes of orbitals s, p, d, f. (49)
- Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals.(50)
S20 5Mi
- State and explain Pauli's exclusion principle.(52) **(M19 2M) M23 5Mi**
- i) Describe the Aufbau principle. (52) **M21 2M (State Aufbau principle)**
ii) Write the electronic configuration of Fe^{2+} ion.
iii) How many radial nodes exist in 2s and 4f orbitals **(MQ19)**
- State Hund's rule (53)
- Give the electronic configuration of Mn^{2+} , Cr^{3+} , Ni^{2+} and Fe^{3+} .(53) **J22 5Mii**
- Write the electronic configuration and orbital diagram for nitrogen. (54) **M22 5Mii**
- Give the electronic configuration of Copper and Chromium (55)

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24. In degenerate orbitals, why do the completely filled and half-filled configurations are more stable than the partially filled configuration? (55) (S20 2M COMPULSORY)

25. What is exchange energy? How it is related with stability of atoms? Explain with suitable examples. (56) S21 5Mi

PROBLEM- De-Broglie, Heisenberg uncertainty principle & study all book back question & answer.

Lesson 3 PERIODIC CLASSIFICATION OF ELEMENTS

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
9	6	7	8	8	9	6	9	8	6				

- State Johann Dobereiner's law of triads. (69) **M19 5Mi**
- Write a note about Chancourtois classification. (70)
- State the Newland's law of octaves. (70)
- State Lothar Meyer law. (70)
- State Mendeleev's periodic law. (70)
- Explain about the relationship between the atomic number of an element and frequency of the X-ray emitted from the elements. (72)
- Define modern periodic law. (73) **M23 5Mii**
- Nomenclature of elements with atomic number greater than 100. (75)
- Variation of electronic configuration along the periods. (76)
- Variation of electronic configuration along in the Groups. (76) s, p, d, f (**J22 5Mi**) block elements.
- Give the general electronic configuration of Lanthanides and actinides. (78) (**J19 2M, M24 5Mii**)
- Define atomic radius (79) **S21 5Mi**
- Covalent radius (79) calculation (79)
- What are isoelectronic ions? Give examples. (bb)
- Explain the Pauling's method of determination of ionic radius. (83) (**MQ19, S20 3M, M22 5M**)
- What is effective nuclear charge? (79)
- Effective nuclear charge calculation (81)
- Calculate the effective nuclear charge on 4s electron and 3d electron in scandium. (81) **J23 5M**
- Define ionisation energy & variation of group, period. (84)
- Describe the periodic trend of ionisation potential. (84) **M24 3M**
- Define ionization energy. The first ionization energy of Nitrogen is greater than that of Oxygen - give appropriate reason. (84) (**MQ19**) (**J19**)
- Explain the fact that the second ionisation potential is always higher than first ionisation potential. (BBQ30) (84) **J23 3M**
- Compare the ionisation energy of beryllium and boron. (85) **J22 3M**
- Define electron affinity (**M22 3M**) & variation of group, period. (86)
- Explain why the electron affinity of Be and N is almost zero. (86) (**S20 5Mii**)
- Define electronegativity. **M24 2M**. State the trends in the variation of electronegativity in group and periods. (87) **S21 3M, J22 5Mii**

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27. Define – valency. (88) (M19 2M)

28. Explain diagonal relationship. (90) (M19 3M, S21 5Mii, M23 3M, J24 5Mii.)

29. Why halogens act as oxidizing agents? (BB97) **J24 3M**

& study all book back question & answer

Lesson 4 HYDROGEN

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
6	6	9	3	3	3	7	9	7	8				

1. Hydrogen Position in periodic table. (101)

2. What are isotopes? Write the names of isotopes of hydrogen. (101) **M23 5Mi**

3. Write note on ortho hydrogen and para hydrogen. (102)

4. How do you convert parahydrogen into ortho hydrogen? (102) (S20 3M, S21 2M, **M23 3M**)
(What is ortho and para hydrogen? How do you convert para hydrogen into ortho hydrogen?) **J24 5M**

5. What is the difference between Ortho hydrogen and para hydrogen. (103)

6. Preparation of hydrogen i) from water ii) Lab preparation **S20 5Mi** iii) industrial production. (103)7. What is water gas shift reaction. (103) **J23 5Mi, J24 2M**

8. Preparation of Deuterium from heavy water. (104)

9. Preparation of Tritium. (104) (M19 3MARK, **J23 2M**)10. Chemical properties of Hydrogen. i) O_2 ii) X_2 iii) Li, Na, Ca iv) ethyne (104)11. Explain the exchange reactions of deuterium. (105) (MQ19, **S20 2M**)

12. Properties of Tritium. (105)

13. Explain uses of hydrogen. (105) **M24 3M**14. Chemical properties of water i) Na, Ba, Fe ii) Cl_2 , F_2 (108)

15. Water is an amphoteric oxide. why? (108)

16. What is temporary hardness of water? How is it removed? (109)

17. What is permanent hardness of water? How it will be removed? (109)

18. Chemical properties of heavy water. i) NaOH, HCl, NH_4Cl ii) H_3PO_2 iii) Al_4C_3 , CaC_2 , Mg_3N_2 , Ca_3P_2 (111)

19. Do you think that heavy water can be used for drinking purpose? (BB)

20. What are the uses of heavy water. (111) **J23 3M**21. Preparation of hydrogen peroxide from BaO_2 , Na_2O_2 , 2-ethylanthraquinone (111)22. Complete the following equation. $Na_2O_2 + ? \rightarrow Na_2SO_4 + H_2O_2$ (111) **M19 5Mii**

23. Hydrogen peroxide can function as an oxidizing agent as well as reducing agent. Substantiate this statement with suitable examples. BB (112)

24. What are the uses of hydrogen peroxide. (112)

25. Compare the Structures of water (106) and hydrogen peroxide. (112)

26. Mention the three types of covalent hydrides. (113) **M22 2M**27. Give an example for ionic hydride and covalent hydride. (113) **J22 2M**28. What are Interstitial hydrides? Give an example. (Metallic hydrides.) (113) **M24 5Mi****E.MUTHUSAMY MSc(ChE), MSc(Psy), MEd., MPhil., MA(Eng), MA(T), MA(PA), MA(Soc), BLISc., DMLT.****B. SARANYA MUTHUSAMY BE., BEd., You Tube: ACTC Chemistry Whatsapp: 9940847892**

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29. Explain types of hydrogen bonding. (114)

30. How do you expect the metallic hydrides to be useful for hydrogen storage? (117)

31. Explain hydrogen -future fuel. (117)

& study all book back question & answer**Lesson 5 ALKALI AND ALKALINE EARTH METALS**

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
7	8	4	7	7	7	5	6	8	7				

- General characteristics of alkali metals. Or 1s block elements. (126)
- Distinctive (anomalous) behavior of Lithium. (129)
- Discuss the Similarities between Lithium and Magnesium. (129) **J22 5M**
- Among the alkali metal halides, which is covalent? Explain with reason. (130) **(J19)**
- Why blue colour appears during the dissolution of alkali metals in liquid ammonia? (130) **J19 5Mi**
- Uses of alkali metals. (131)
- Except LiF, all other halides are soluble in water. Why? (132)
- Write the chemical equations for the reactions involved in Solvay process of preparation of sodium carbonate (washing soda). (132)
- What is soda ash? Write equations. (133)
- Uses of washing soda? (133)
- Explain preparation, uses of cooking salt. (133, 134)
- Explain preparation, uses of sodium hydroxide. (134)
- What are the uses of sodium bicarbonate. (134) **J23 5Mii**
- Explain biological importance of sodium and magnesium. (135)
- General characteristics of alkaline earth metals. Or 2s block elements (136)
- Distinctive (anomalous) behavior of Beryllium. (139)
(What are the reasons for the anomalous properties of Beryllium? (139) **M22 5Mi**)
- Explain the properties of Beryllium that are difference from other elements of the group. 139 **M22 5Mii**
- Discuss the similarities between beryllium and aluminum. (140) **(MQ19, J19, S21 5M, J23 3M, M24 5M)**
- Among the alkaline earth metals BeO is insoluble in water but other oxides are soluble. Why? 142 **(M19 5Mi)**

ANSWER:**(i) BeO is insoluble in water**

BeO is covalent in nature, While other alkaline earth metal oxides are ionic in nature

20. Uses of alkaline earth metals Mg (**S20 5Mii**), Ca **M23 5Mii**, Sr, Ba, Ra. (141)

21. Explain preparation, properties and uses of Quick lime. (144)

22. Explain preparation, properties and uses of calcium hydroxide. (144)

23. How is bleaching powder prepared? 145 **S20 5Mi, J24 3M****E. MUTHUSAMY MSc_(Che), MSc_(Psy), MEd., MPhil., MA_(Eng), MA_(T), MA_(PA), MA_(Soc), BLISc., DMLT.****B. SARANYA MUTHUSAMY BE., BEd., You Tube: ACTC Chemistry Whatsapp: 9940847892**

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24. Explain why $\text{Ca}(\text{OH})_2$ is used in white washing. (145) **M19 3M**
 25. Explain properties and uses of Gypsum. (145)
 26. Plaster of Paris preparation and uses. (147) **(MQ19) M23 2M**
 27. Explain biological importance of magnesium and calcium. (148) **J24 5Mi**
 28. Write the balanced equation for each of the following chemical reactions.
 (i) Reaction of metallic Lithium with Nitrogen gas **(MQ19) BB 154**
 (ii) Heating solid sodium bicarbonate.
 (iii) Rubidium with oxygen gas.
 (iv) Solid potassium hydroxide with CO_2
 (v) Heating calcium carbonate. **M24 2M**
 (vi) Heating calcium with oxygen. **& study all book back question & answer**

Lesson 6 GASEOUS STATE

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24			
5	9	5	4	5	4	4	11	6	8			

1. What is difference between gas and vapour. (159)
 2. Boyle's experiment. (160)
 3. State Boyle's law. (160) **J24 5Mii**
 4. All passenger aeroplane cabins have to be artificially pressurized? (161)
 5. State Charles law. (162)
 6. Inside a certain automobile engine, the volume of air in a cylinder is 0.375dm^3 when the pressure is 1.05atm . when the gas is compressed to a volume of 0.125dm^3 at the same temperature. What is the pressure of the compressed air? (162) **S21 3M COMPULSORY**
 7. Find the missing parameters (164) **(MQ19)**

$P=1\text{ atm}$	$P=1\text{ atm}$	$P=1\text{ atm}$
$V_1=0.3\text{dm}^3$	$V_2=?$	$V_3=0.15\text{dm}^3$
$T_1=200\text{K}$	$T_2=300\text{K}$	$T_3=?\text{K}$

8. State Gay Lusaac' law. (164)
 9. State Avogadro's law. (165)
 10. Give the mathematical expression that relates gas volume and moles. (165) **J24 2M**
 11. Derive ideal gas equation. (165) **J19 5M, M23 3M**
 12. What are ideal gases? (165) **(M19 2M)**
 13. State Dalton's law of partial pressures. (166) **M22 3M, M24 2M**
 14. State Grahams law of diffusion. (168) (state Diffusion law). **M19 5Mii, J23 2M**
 15. Distinguish between diffusion and effusion. (168) **MQ19, J22 3M**
 16. Define compressibility factor. **(169)**
 17. Write the mathematical formula for compressibility factor Z. (169) **S20 5Miii**
 18. Define Boyle temperature or Boyle point. (171)
 19. Compressibility factor for real gases. (171)
 20. Write the Vander Waals equation for a real gas. Explain the correction term for pressure and volume. (171) **M24 5Mii(volume correction)**

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21. Write the Vander Waals equation for real gases and explain the terms involved. (171) **J24 3M**
22. Define critical temperature, critical pressure, critical volume. (173)
23. Derive the values of critical constants in terms of Vander Waals constants. (174) **M23 5M**
24. Define Joule-Thomson effect. (175) **J23 5Mi**
25. Define inversion temperature. (175)
26. What are the methods used for liquefaction of gases. (175) **S20 5Mii, J23 3M**
27. A sample of gas at 15 °C at 1 atm. has a volume of 2.58 dm³. When the temperature is raised to 38 °C at 1 atm does the volume of the gas increase? If so, calculate the final volume. (183 BBQ44) **J23 5Mii**

Study lesson **EXAMPLE** problem and Evaluation & study all book back question & answer

Lesson 7 THERMODYNAMICS

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24			
9	6	11	8	10	10	11	8	9	11			

1. Write note on system. (187)
2. Define Surrounding & Boundary. (188)
3. What are the types of system. (188)
4. What is isolated system? Give example. (188)
5. Explain closed system with an example. (188)
6. What is open system? Give example. (188)
7. Explain intensive properties with two examples. (189) **J23 2M**
8. Explain extensive properties with two examples. (189)
9. Distinguish between extensive and intensive property? (189) **(S20 3M)**
10. What is reversible process? Give an ex (189)
11. What is an irreversible process? Give an example. (189)
12. Define adiabatic process? (190)
13. Define isothermal process. (190)
14. Define isobaric process. (190)
15. Define isochoric process. (190)
16. Define cyclic process. (190)
17. What is state function? Give two examples. (190) **(MQ19) M23 3Mi**
18. What is path function? Give two examples. (190) **J22 2M M23 3Mii**
19. What is meant by internal energy? (191)
20. List the characteristics of internal energy. (191) **M22 5M, M24 5M**
21. Calculate the work involved in expansion and compression process. (193)
22. Explain sign convention of heat and work. (194) **(M22 2M)**
23. Define Zeroth law of thermodynamics (or) Law of thermal equilibrium. (195) **(S20 2M)**
24. State first law of thermodynamics. (195) **S21 5Mi**
25. Derive the various mathematical statements of the first law. (196)

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26. Explain the relation between enthalpy (H) and internal energy (U). (197) (Derive the relation between enthalpy ΔH and internal energy ΔU for an ideal gas. Explain each term involved in the equation. BBQ50 (S20 5Mi, J23 5M)
27. Define standard heat of formation. (198)
28. Explain thermochemical Equations. (198)
29. Define heat of combustion. (200)
30. Calculate ΔH_f^0 for the reaction $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$, given that ΔH_f^0 for $CO_2(g)$, $CO(g)$ and $H_2O(g)$ are -393.5 , -111.31 and $-242 kJ mol^{-1}$ respectively. (200) (MQ19)
31. Define molar heat capacity. Give its Unit. (201) (J19) 3mark
32. Relationship between C_p and C_v (201)
33. Explain Bomb calorimeter. (203)
34. Explain coffee cup calorimeter. (204)
35. What are the applications of the heat of combustion. (205)
36. Define heat of solution. Give an example. (206)
37. Define heat of neutralization. Give an example. (206)
38. Define molar heat of fusion. Give an example (206)
39. Define heat of vaporization. Give an example (207)
40. Define heat of sublimation. Give an example. (207)
41. Define heat of transition. Give an example. (207)
42. State Hess's law of constant heat summation. (207) S21 2M, M24 3M
43. Define lattice energy. (208)
44. Explain Born-Haber cycle. (208)
45. Explain various statement of second law thermodynamics. (210) M23 5M
46. Define entropy. (210) J22 5Mi
47. If an automobile engine burns petrol at a temperature of $816^\circ C$ (1089K) and if the surrounding temperature is $21^\circ C$ (294K). Calculate its maximum possible efficiency. (211) J22 2M COM
48. An engine operating between $127^\circ C$ and $47^\circ C$ takes some specified amount of heat from a high temperature reservoir. Assuming that there are no fractional losses, calculate the percentage efficiency of the engine. (211) J24 5Mii
49. Write note on standard entropy change (212)
50. Define standard entropy of formation. (212)
51. Write note on Entropy change accompanying change of phase. (212)
52. $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ Calculate the standard entropy change for the above reaction, given the standard entropies of $CO_{2(g)}$, $C_{(s)}$, $O_{2(g)}$ are 213.6 , 5.740 and $205 JK^{-1}$ respectively. (212) (M19 5Mi)
53. Calculate the entropy change during the melting of one mole of ice into water at $0^\circ C$. Enthalpy of fusion of ice is $6008 J mol^{-1}$. (213) (M19 5Mi, S20 5Mii) M23 2M compulsory
54. Define Gibbs free energy & character (214) S21 2M, J22 5Mii, J24 2M
55. What are the Conditions (Criteria) for spontaneity of a process. (215) M22 2M, S21 5Mii
56. State the third law of Thermodynamics. (218) (M19 2M, J24 5Mi)
- & study all book back question & answer**

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M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
6	6	5	6	6	11	6	6	9	11				

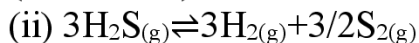
- Why the chemical equilibrium is referred to as Dynamic equilibrium. (5)
- Explain Homogeneous equilibrium and Heterogeneous equilibrium give an example. (5) **S20 2M, S21 3M**
- State law of mass action and mention its unit. (5) **M23 5Mi**
- Define equilibrium constant. Give any one application of equilibrium constant. (**MQ19**)
- Derive the relation between K_p and K_c for a general homogeneous gaseous reaction. (6)**J19 5Mi**
- What is the relation between K_p and K_c ? Give one example for which K_p is equal to K_c ? (7) **S21 2M**
- What is equilibrium constant? (6)
- If $\Delta n_g = 0$, +ve, -ve mention the relationship between K_p and K_c (7)
- Write a balanced chemical equation for a equilibrium reaction for which the equilibrium constant is given by expression $K_c = \frac{[NH_3]^4[O_2]^5}{[NO]^4[H_2O]^6}$ (BB) **M22 2M**
- Write K_p , K_c and Δn_g (i) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ (ii) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ (iii) $2CO_{(g)} \rightleftharpoons CO_{2(g)} + C_{(s)}$ **J23 2M**
- Write the Balanced chemical equation for the $K_c = \frac{[CaO_{(s)}][CO_{2(g)}]}{[CaCO_{3(s)}]}$ (8) **M19 5Mii**
- What is reaction quotient? (11)**S20 5Mii, J23 5Mi, (MQ19 2M)**
- Application of equilibrium constant. (10)
- How equilibrium constant help to find the direction of chemical equilibrium? (10)
- How will you predict the feasibility of a reaction using Q value? (Q compare K_c .) (11)
- Derive the K_p and K_c value for formation of HI (12) **M24 3M**
- Derive the K_p and K_c value for Dissociation of PCl_5 (13)
- Derive the K_p and K_c value for synthesis of ammonia (14) **J22 5M, J24 5M**
- One mole of H_2 and one mole of I_2 are allowed to attain equilibrium mixture contains 0.4mole of HI. Calculate the equilibrium constant. (13)
- The equilibrium concentrations of NH_3 , N_2 and H_2 are $1.8 \times 10^{-2}M$ and $3 \times 10^{-2}M$ respectively. Calculate the equilibrium constant for the formation of NH_3 from N_2 and H_2 .(14) **M22 3M C**
- State Le- Chatelier Principle(16) (**GMQ19, M19 3MARK M23 2M**)
- Effect of concentration. (16)
- If there is no change in concentration, why is the equilibrium considered dynamic? (16) **J24 2M**
- Effect of Pressure. (17)
- Effect of Temperature. (18)
- Effect of catalyt.(18)
- What is the effect of added inert gas on the reaction at equilibrium? (19) **J19 2MARK**
- Deduce the Van't Hoff equation. (20) **M24 5M**

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29. At particular temperature $K_C = 4 \times 10^{-2}$ for the reaction $H_2S_{(g)} \rightleftharpoons H_{2(g)} + \frac{1}{2} S_{2(g)}$. Calculate the K_C for each of the following reactions. **(27 BBQ₄₅) J22 3M**

**9. Solutions**

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
7	9	6	11	11	6	5	6	5	4				

- Define solution, solute, solvent. (31)
- Explain the different type of solutions based on the physical state of the solute and solvent. (31)
- Define Molality **J23 3M** and Molarity (32)
- Calculate the molality of the solution containing 90g of glucose dissolved in 2kg of water. (32) **M24 2M Compulsory**
- Define Normality and Formality (32)
- Define Mole fraction and Mass percentage (33)
- Calculate the mole fraction of methanol and water when 0.5mole of methanol is mixed with 1.5moles of water. (33) **S20 3MARK**
- Define Molarity. If 5.6 g of KOH is present in 250 ml of the solution, calculate the molarity of the solution. (34) **(MQ19)**
- Define volume percentage and mass by volume percentage (34)
- Define parts per million (34)
- 50g of tap water contains 20mg of dissolved solids. what is the TDS value in ppm?(34) **J22 2M**
- What are the advantages of using standard solutions? (35)
- What are standard and working solutions? (35)
- Define solubility (36)
- What are the factors influencing the solubility? (36)
- What is the nature of solute and solvent? (36)
- How does temperature affect the solubility? (36)
- Draw and explain the graph obtained by plotting solubility versus temperature for calcium chloride. (37) **J19 5Mii**
- Explain the effect of pressure on solubility? (38) **J24 5Mi**
- State Henry's law (38)
- NH_3 and HCl do not obey Henry's law. Why?(38) **M19 5Mi**
- What are the limitations of Henry's law? (40) **M23 5Mii**
- Define vapour pressure (41)
- State Raoult's law (43) **M24 5Mi**
- How will you compare Raoult's law with Henry's law? (45)
- What are ideal solutions? Give example. (45) **S21 3M**
- What are conditions when a solution tends to behave like an ideal solution? (46) **J22 3M**
- What are non-ideal solutions? Give example. (46)
- What are the conditions for Non ideal solutions? (46)
- Explain the positive deviation of non-ideal solutions (46)

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31. Explain the negative deviation of non-ideal solutions (47)
32. Explain the factors responsible for deviation from Raoult's law (48)
33. What are colligative properties? (49) **J23 5Mii**
34. What is relative lowering of vapour pressure? (49)
35. Determination of Molar mass weights from relative lowering of vapour pressure (50) Or
Write the formula to calculate the molar mass of a solute from relative lowering of vapour pressure values. (50) **(M22 3M)**
36. Determination of molar mass of solute from elevation of boiling point (52) **M22 5M**
37. What is Ebullioscopic constant? (52)
38. Determination of molar mass of solute from depression in freezing point (54)
39. What is molal depression constant? (54) **S21 2M**
40. What is Cryoscopic constant? (54)
41. Define osmosis (55)
42. Define osmotic pressure? (55) **M23 2M**
43. What is isotonic solution? (56) **M19 3MARK, M22 2M, J24 3M**
44. How will you determine the molar mass of a solute from osmotic pressure (56) **S21 5M**
45. Explain the application of reverse osmosis in water purification (57)
46. Define reverse Osmosis (57)
47. What is abnormal molar mass? (58)
48. What is Van't Hoff factor 'I'? (58) **S20 5Mi**
49. Calculate the mass of non-volatile solute (molar mass 80 gmol^{-1}) which should be dissolved in 92 g of toluene is reduced to its Vapour pressure to 90%. **BBQ20 63(MQ19)**

10. Chemical Bonding

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
8	8	9	14	14	14	8	12	11	6				

1. State Octet rule (69)
2. What is covalent bond? (61)
3. Draw the Lewis dot structures for sulphur trioxide. (71) **(MQ19)** Study Lewis dot structure of H_2O , NH_3 , CH_4 , N_2O_5 , HNO_2 , H_3PO_4 , NO_3^- , SO_4^{2-} , HNO_3 , O_3 . **M23 2M (water, nitric acid)**
4. How will you find formal charge of an atom? (72)
5. What are the molecules not obeying the octet rule? (73)
6. What is ionic or electrovalent bond? (74)
7. Explain the ionic bond formation in KCl , MgO and CaF_2 . (75)
8. What is coordinate covalent bond? (75)
9. What is bond order? (76) **S21 5Mi**
10. Define bond length? (76) **M22 5Mi**
11. What is bond length? Name the techniques through which the length of a bond can be determined. (76) **M19 2M**
12. Define bond angle. (77) **M22 5Mii**
13. Define bond enthalpy (77) **M22 5Miii**
14. What is resonance? (78) **S21 3M**

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15. Explain the resonance structure of CO_3^{2-} (78)
16. What is dipole moment? (79) **J24 5Mii**
17. What is polar covalent bond? Give an example (79)
18. CO_2 has zero dipole moment even though two polar bonds. Why? (80)
19. How will you find ionic character? (80)
20. What is polarization? (80)
21. Linear form of carbon dioxide molecule has two polar bonds. Yet the molecule has zero dipole moment. Why? (80) **J19 2M**
22. How will you determine the ionic character in covalent bond using electronegativity values? (80) **M22 5M**
23. State Fajan's rule (81) **MQ19, J22 3M, J23 3M**
24. What are the important principles of VSEPR theory? (81)
25. Write the shape and molecular geometry for BF_3 . (82) **S20 2M**
26. Give the shapes of molecules predicated by VSEPR theory (82) **S21 3M**
a) BeCl_2 b) NH_3 c) H_2O
27. Predict the shape of ClF_3 and NH_3 using VSEPR theory. (83) **(MQ19)**
28. Write the structure of the following compounds. (84) **M19 5Mii**
a) NH_3 (B) BF_3 **(S20 2M)**
29. Mention the shape of following molecule base on VSEPR theory. (82-84) **J22 5M**
(i) BF_3 (ii) BrF_3 (iii) PCl_5 (iv) SF_6 (v) IF_7
30. Both C_2H_2 and CO_2 have the same structure. Explain why?. **M19 3MARK**

ANS: **C_2H_2 and CO_2 have same structure**In Both of these compounds carbon undergoes 'SP' hybridization. So C_2H_2 and CO_2 have same shape.

3

Linear structure only. ----- (1)

31. Explain the salient features of VB theory (86) **S21 5Mii**
32. Define sigma, Pi bond? (87) **J23 3M COMPULSORY, M24 3M(Pi bond)**
33. Explain the formation of H_2 **S21 5M**, F_2 , HF **(M22 3M)**, O_2 molecule by overlapping of orbitals (87-89)
34. Draw the hybridization in BeCl_2 (90)
35. What is hybridization? (89) Mention the type of hybridisation found in CH_4 . (92) **S20 3M**
36. Write the hybridisation present in the following compounds. **M24 2M**
a) BF_3 b) CH_4 c) PCl_5 d) SF_6
37. Draw the hybridization in BF_3 (91), CH_4 (92), PCl_5 (93), SF_6 (94), ethylene molecule (95), acetylene molecule (96)
38. Explain the salient features of Molecular orbital Theory (99) **S20 5Mii, M23 5M**
39. Explain the molecular formation of the following by MOT i) H_2 ii) Li_2 iii) B_2 iv) C_2 **J22 5M** (99) v) N_2 **J20 5Mi, J23 5M, M24 5M** vi) O_2 **J24 3M COMPULSORY** vii) CO viii) NO (100)

LESSON 11. FUNDAMENTALS OF ORGANIC CHEMISTRY**E.MUTHUSAMY MSc(Chem), MSc(Psy), MEd., MPhil., MA(Eng), MA(T), MA(PA), MA(Soc), BLISc., DMLT.****B. SARANYA MUTHUSAMY BE., BEd., You Tube: ACTC Chemistry Whatsapp: 9940847892**

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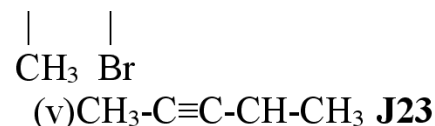
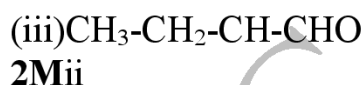
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M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
11	10	13	10	9	10	9	8	6	8				

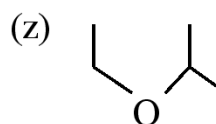
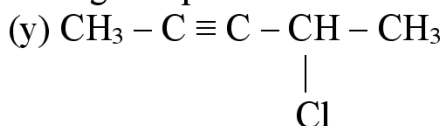
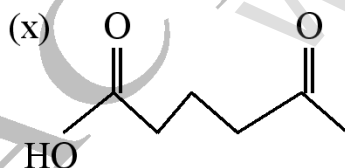
- Which element exhibits maximum catenation and why? 110 S20 2M
- What are characteristics of organic compounds?(111) M23 5Mi
- What is meant by homologous series. (112) S21 5Mi, M24 2M
- Gives the general formula for the following class of organic compounds. (112) S21 3M
a) Alkanes b) alkenes c) alkynes
- How organic compounds are classified. Based on structure (112) J23 5M
- Give an example for each of the following type of organic compounds. (112) J22 3M

COMPUL

- Non benzenoid aromatic compound.
 - Aromatic heterocyclic compound
 - Carbocyclic compound.
- How organic compounds are classified. Based on functional groups(112)
 - Find the functional group of the following compounds.BB M23 5Mii
a) Acetaldehyde b) Oxalic acid c) Dimethyl ether d) methylamine
 - Give the structure for the following compounds: J24 2M
i) 1,3-dimethyl cyclohexane ii) 3-ethyl-2-methyl-1-pentene
 - Give the structural formula for the following compounds S21 5Mii
a) 3-methyl pentane b) 2-methylpropan-2-ol c) propanone
 - Give the IUPAC name for the following compounds. M24 5Mi
a) $\text{CH}_3\text{CH}_2\text{COOH}$ b) $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$ c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_2$
 - Give the IUPAC name of the following compounds M22 5M (i) $\text{CH}_3\text{-CH-CH-CH}_3$ (ii) $\text{CH}_3\text{-O-CH}_3$



13. Write the IUPAC names for the following compounds. J19 5Mi



14. Give the structural formula for the following compounds. (124) (M19 3MARK Compulsory, M23 3M compulsory)

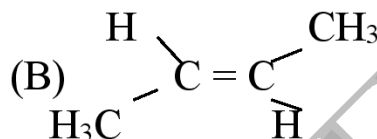
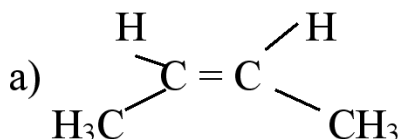
- m - dinitrobenzene
- p - dichlorobenzene
- 1,3,5 Tri - methyl Benzene

15. Define isomerism. (132)

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16. Describe any two types of constitutional isomers. (132) **J22 5M**
 17. Define chain isomers. Give an example. (132)
 18. Define position isomers. Give an example. (132)
 19. Define functional isomers. Give an example. (133)
 20. Define metamerism. Give an example. (133)
 21. Define tautomerism. Give an example. (134)
 22. Define Ring chain isomers. Give an example. (134)
 23. Define stereoisomerism. (134)
 24. Define geometrical isomerism. Draw 2-butene cis, trans isomerism. (135) **(S20) 3mark comp**
 Identify the cis and trans isomer for the following compounds. (135) **M19 5Mi**



25. Draw Cis – Trans isomers for 2,3- dichloro -2-butene. (135) **(MQ19)**
 26. Draw oximes and azo compounds cis, trans isomerism. (136)
 27. Define optical isomerism. Give an example. (137) **M22 3M**
 28. Explain optical isomerism of Lactic acid. (137)
 29. Define enantiomerism. (137)
 30. Describe the reactions involved in the detection of nitrogen in an organic compound by Lassaigne method. (138) **M19 2M**
 31. Test for sulphur. (139)
 32. Test for halogen. (139)
 33. Test for phosphorus. (139)
 34. Estimation of carbon and hydrogen. (140)
 35. Give the principle involved in the estimation of halogen in an organic compound by carius method. (142) **J24 5M**
 36. Estimation of phosphorus. (143)
 37. Which is the suitable method for detection of nitrogen present in food and fertilizers? (146) **M19 2M COMPULSORY**
 38. Explain the purification of solid organic compound by crystallization method. (148) **S20 5M**
 39. Write note on column chromatography, thin layer chromatography, paper chromatography. (151)
 40. Define retention factor. (152)

REVISE ALL Structure IUPAC NAME, problem & study well BOOK BACK QUESTION & ANSWER

LESSON 12 Basic concepts of Organic reactions

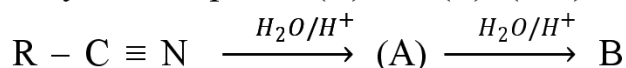
M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
7	7	2	4	5	4	4	1	6	3				

1. What are homolytic and heterolytic cleavages? (162)
 2. What is the hybridization of carbon in carbocation? (163)

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- What are Nucleophiles and electrophiles? Give an example (164) (M19 5Mii, M22 3M, M24 3M)
- Explain Inductive effect in the organic compounds (166) (J19) **M23 3M**
- Explain Electromeric effect (167) (M19) **J24 5Mi**
- What is resonance. (168) **S21 3M**
- Explain resonance or mesomeric effect and its types (168).
- Explain with example the positive Mesomeric effect. (169) **M19 5Mii**
- The bond length between all the four carbon atoms is same in 1, 3- butadiene. Explain with reason.(168) **J19 3MARK Compulsory**
- Write no bond resonance structure shown by propene. (169) (S20 2M)
- Explain hyper conjugation effect (170) (MQ19, J22 3M, J24 3M)
- Write β -elimination reaction. (172) **M24 5Mii**
- Identify the compound (A) and (B). (173) **M19 5Mii**

**ANSWER****& study well BOOK BACK QUESTION &****13.Hydrocarbons**

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
8	9	9	11	11	11	8	9	9	6				

- How are hydrocarbons classified? (179)
- Write the IUPAC name for the following compound. 181 **M19 5Mi**
 (A) $CH_3 - CH - CH_2 - CH_3$ (B) $\begin{array}{c} CH_3 \\ | \\ H_3C - C - CH_3 \\ | \\ CH_3 \end{array}$
- Write the structural formula and carbon skeleton for all possible chain isomers of C_4H_{10} , C_5H_{12} , C_6H_{14} . (181,182)
- What is Sabatier Sendersen reaction? (184)
- What is meant by Decarboxylation? decarboxylation of sodium acetate. (184)
- Wurtz reaction. (184)
- How will you convert ethyl chloride in to i) ethane (**M22 2M**) ii) n - butane (bb) (184)
- Corey house mechanism. (185)
- Write note on Kolbe's electrolytic method of preparation of alkanes (184) **J22 2M**
- How is **Alkane** (methane) prepared from Grignard reagent. (185) **M19 2M**
- Complete the following: (184, 185) **S21 2M COMPULSORY**
 a) $CH_3-CH=CH_2 + H_2 \rightarrow$
 b) $CH_3MgCl + H_2O \rightarrow$
- Write note on confirmation of ethane, Butane. (186, 187)
- Write the chemical equations for combustion of propane.(bb)(188)

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14. Define pyrolysis. Give an example. (189)

15. Uses of alkane. (190)

16. Explain Geometrical isomerism of 2-butene. (191) **S20 3M COMPULSORY**

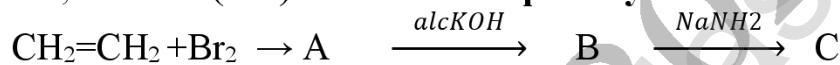
17. How are alkenes prepared from alkynes by Lindlar's catalyst? (192)

18. $\text{CH}_3\text{CH}_2\text{Cl} \xrightarrow{\text{ConcH}_2\text{SO}_4 \text{ 430-440K}} \text{A} \xrightarrow{\text{HBr Benzoyl peroxide}} \text{B}$ 192, 195 **J23 2MCOM**19. Suggest a simple chemical test to distinguish propane and propene. (bb)(194) **S21 3M**

20. Explain Markownikoff's rule with suitable example. (194)

21. An organic compound (A) C_2H_4 decolourises bromine water. (A) on reaction with chlorine gives (B). (A) reacts with HBr to give (C). Identify (A), (B) and (C). Explain the reactions. (194) **J22 5M**

22. What happens when isobutylene is treated with acidified potassium permanganate? (bb)(198)

23. What happens when ethylene is passed through cold dilute alkaline potassium permanganate. (197-198) **M22 3M**24. An organic compound (A) of molecular formula $\text{C}_2\text{H}_6\text{O}$, on heating with conc. H_2SO_4 gives compound (B). (B) on treating with cold dilute alkaline KMnO_4 gives compound (C). Identify (A), (B) and (C) and explain the reactions. (197) **J20 5Mi**25. Ozonolysis of alkene. (198) **J19 2M**26. What is polymerization? preparation of polyethene. (199) **J19 3M**27. Find A, B and C. (200) **M24 3M Compulsory**28. Complete the reaction: $\text{CaC}_2 \xrightarrow{\text{H}_2\text{O}}$ 202 **J23 5Mi**29. Explain the different types of polymerisations in ethyne. 204 **S20 3M**30. How will you distinguish 1-Butyne and 2-Butyne? **J24 5Mii**31. How does Huckel rule help to decide the aromatic character of a compound. (205) **S21 5Mi, J23 3M, J24 2M**32. Explain the evidence of structure of benzene (207) **M23 5M**33. Write any two different components you get during fractional distillation of Coal tar at any two different temperatures. (209) **M19 5Mii**

34. Explain preparation of benzene (3 methods) (210)

35. Electrophilic substitution reaction of benzene

(Nitration, halogenation, Sulphonation, Methylation, Acetylation) (211-212)

36. How will you get the following products with the given reactants? (210) **M19 5Mi**(A) Acetylene \rightarrow Benzene **S21 5Mii, M24 5Mia**(B) Phenol \rightarrow Benzene **M24 5Mib**(C) Benzene \rightarrow Toluene37. How will you prepare the following compounds from benzene? **M22 5M**

(i) Nitrobenzene (ii) Benzene sulphonic acid (iii) BHC

38. The simple Aromatic Hydrocarbon compound (A) reacts with Bromine to give (B). Compound (A) reacts with Raney Ni and gives (C). Identify (A), (B) and (C). (211,215) **M19 5Mii**

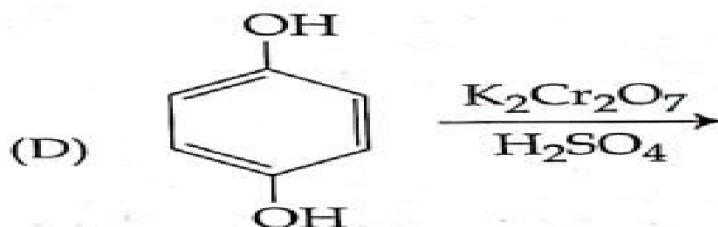
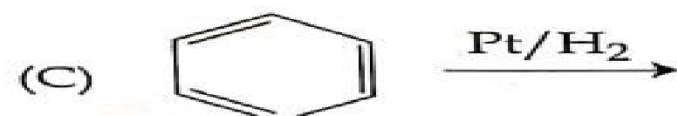
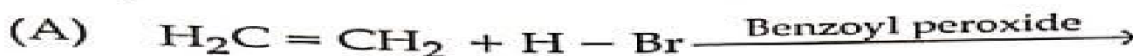
39. Wurtz-Fittig reaction. (210)

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42. Describe the mechanism of nitration of benzene (211,212,213)

43. Describe the mechanism of Nitration of benzene. (214)

44. Brich reduction(215) **J19 5Mii, S20 5Mii, J22 3M**45. Complete: 195, 215 **S20 5Mi**

46. Write short notes on ortho, para directors in aromatic electrophilic substitution reactions. (216)

47. Write short notes on meta directors in aromatic electrophilic substitution reactions. (216)

&PRACTICE WORK SHEET study well BOOK exercise questions.**14. Haloalkanes and Haloarenes**

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
9	6	9	9	8	8	7	6	6	8				

1. How are organic halogen compounds classified? (226)

2. IUPAC NAME, common name (228)

3. Nature of C-X bond in haloalkane. (229)

4. How are hydrogen halides prepared using Lucas reagent? (230)

5. Mention any two methods of preparation of haloalkanes from alcohols? (230) **J22 2M**

6. What is Darzen's halogenation? (231)

7. Write note on Finkelstein reaction or (How will you prepare n propyl Iodide from n propyl bromide?) (231)

8. Chlorination of methane. (231)

9. Write note on Swartz reaction (231) **S21 2M**

10. Why chlorination of methane is not possible in dark? (231)

15. What is Hunsdiecker reaction? (231)

16. Physical properties. (Boiling point and melting point, solubility, density) 232

17. What is ammonolysis? (233)

18. How does haloalkanes reacts with silver nitrite? (234)

19. What is Williamson ether synthesis? (234) **M19 3M****E.MUTHUSAMY MSc(ChE), MSc(Psy), MEd., MPhil., MA(Eng), MA(T), MA(PA), MA(Soc), BLISc., DMLT.****B. SARANYA MUTHUSAMY BE., BEd., You Tube: ACTC Chemistry Whatsapp: 9940847892**

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20. Explain S_N2 mechanism. (234) **M24 3M**
21. Explain S_N1 mechanism. (234)
22. Explain $E2$ mechanism. (236)
23. Explain $E1$ mechanism. (236) (Explain the mechanism involved in the elimination reaction of tertiary butyl chloride with alcoholic KOH. **S20 5M**)
24. How is Grignard reagent prepared? ALL USES (239)
Starting from CH_3MgI , how will you prepare the following?
a) Ethyl alcohol b) Acetaldehyde c) ethyl methyl ether **M23 5Mi**
25. What happens when acetyl chloride is treated with excess of CH_3MgI . (239) **J23 2M**
26. Starting from CH_3MgI , how will you prepare the following? (239) **J22 5M**
(i) Acetaldehyde (ii) Acetone (iii) Methane
27. What happens when acetyl chloride is treated with excess of CH_3MgI . (239) **J24 3M**
27. Write note on sandmeyer reaction (242)
28. What is Balz Schiemann reaction? (242)
29. Raschig process. (242)
30. Among the following compounds, o-dichloro benzene and p-dichloro benzene, which has higher melting point? Explain with reason. (243) **J19 5Mii**
31. What is Dow's process? (243)
32. Write note on Wurtz Fittig reaction (244)
33. Write Fittig reaction. (How does chlorobenzene react with sodium in the presence of ether?) (244)
34. Complete the following reactions. (243,244) **J24 2M COMPULSORY**
- i) $C_6H_5Cl + 2NH_3 \xrightarrow{THF}$
- ii) $CCl_4 + H_2O \xrightarrow{\Delta}$
35. Complete the following reactions. **M22 2M COMPULSORY**
- iii) $C_6H_5Cl + Mg \xrightarrow[50atm]{250^\circ C}$
- iv) $C_6H_5Cl + 2Na + ClC_6H_5 \xrightarrow{Ether}$
36. Discuss the aromatic nucleophilic substitution reaction of chlorobenzene (243)
37. What are the uses of chloro benzene? (244)
38. A simple aromatic hydrocarbon (A) reacts with chlorine to give Compound (B). Compound (B) reacts with ammonia to give Compound (C) which undergoes carbylamine reaction. Identify (A), (B) and (C) and explain the reactions. (242, 243) **J20 5Mii**
39. How will you prepare gem dihalides? (245)
40. Which reaction is used to distinguish gem dihalides and Vic-Dihalides? (246)
41. What is dehalogenation? (246)
42. What is dehydrogenation? (246)
43. How will you prepare chloroform? (247)
44. How is phosgene prepared from chloroform? (248)
45. How will you prepare chloropicrin? (248)

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46. What is carbylamine reaction? (248)
47. What happens when chloroform reacts with oxygen in the presence of sunlight? (248)
48. What are Freons? Discuss their uses (250)
49. How is DDT prepared? (250)
50. Give the structure and uses of DDT? (251) **S20 2M, J23 5Mii, M24 5Mii (uses)**
51. Explain the preparation of the following compounds BB
i) DDT ii) Chloroform iii) Biphenyl iv) Chloropicrin v) Freon-12
52. An organic compound (A) with molecular formula C_2H_5Cl reacts with KOH gives compounds (B) and with alcoholic KOH gives compound (C). Identify (A), (B), and (C). BB **M23 3M**
53. Simplest alkene (A) reacts with HCl to form compound (B). Compound (B) reacts with ammonia to form compound (C) of molecular formula C_2H_7N . Compound (C) undergoes carbylamine test. Identify (A), (B), and (C). BB **S21 5M, M22 5M**
54. A hydrocarbon C_3H_6 (A) reacts with HBr to form compound (B). Compound (B) reacts with aqueous potassium hydroxide to give (C) of molecular formula C_3H_6O . what are (A) (B) and (C). Explain the reactions. BB
55. Two isomers (A) and (B) have the same molecular formula $C_2H_4Cl_2$. Compound (A) reacts with aqueous KOH gives compound (C) of molecular formula C_2H_4O . Compound (B) reacts with aqueous KOH gives compound (D) of molecular formula $C_2H_6O_2$. Identify (A), (B), (C) and (D).

15. Environmental Chemistry

M19	J19	S20	S21	M22	J22	M23	J23	M24	J24				
3	3	7	Corona	corona	corona	5	9	8	7				

1. What is environmental chemistry? (260)
2. What is environmental pollution? (260)
3. What are biodegradable and non-biodegradable pollutants? (260)
4. Differentiate viable and non-viable particulate pollutants. **J24 5Mii**
5. What is greenhouse effect? Name the gases that cause greenhouse effect. (263) **S20 3M, M24 2M**
6. What is global warming? (263)
7. What is acid rain? **M22 2M** What are harmful effects of acid rain? (264) **M24 5M**
8. What are particulate pollutants? Give example (265) **M23 2M**
9. What are the health effects of particulate pollutants. (265)
10. What is smog? (266)
11. What is classical smog or London smog? (266)
12. What are the effects of classical smog? (267)
13. What is photochemical smog or Los Angel Smog? (267)
14. What are the effects of photochemical smog? (268)
15. What is depletion of ozone layer or ozone hole? (268)
16. What is the environmental impact of ozone depletion? (269)
17. Which is considered to be earth's protective Umbrella? Why? (269) **J24 3M**

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18. What is meant by water pollution? What are the causes, harmful effects of chemical water pollution. (271)
19. Define Eutrophication (271) **M23 5Mii**
20. What is Biochemical oxygen demand (BOD)? (271)
21. What is chemical oxygen demand (COD)? (271)
22. Differentiate BOD and COD. (271) **J23 5Mi**
23. What are the harmful effects of chemical water pollutants? (271)
24. Mention the standards prescribed by BIS for qualities of drinking water. (272)
25. What are the total dissolved solids (TDS)? (273)
26. What are the sources of soil pollution. (273)
27. Explain the strategies to control environmental pollution (274) **S20 5Mii**
28. What is Green Chemistry? **J23 5Mii, J24 5Mii** Green chemistry in day-to-day life. (275)

NAME REACTIONS – ORGANIC CHEMISTRY

- | | |
|--|---|
| 1. Sabatier sendersens reaction.(184) | 18. Lucas test (230) |
| 2. Kolbe's electrolytic method. (184) | 19. Dorzens halogenation reaction |
| 3. Wurtz reaction (184) | 20. Finkelstein reaction (231) |
| 4. Corey house reaction. (185) | 21. Swarts reaction (231 & 249) S21 2M |
| 5. Grignard reagent preparation. (185) | 22. Hunsdiccker reaction (231) |
| 6. Aromatization (189) | 23. Williamson ether synthesis. (234) |
| 7. Pyrolysis (189) | 24. TEL (238) |
| 8. Markonikoff's rule. (194 & 231) | 25. Sandmeyer reaction. (242) |
| 9. Anti –markonvnikoff's rule or peroxide effect or kharasch addition. (196) | 26. Gattermann reaction (242) |
| 10. Action of bayer reagent(197) | 27. Balz schiemann reaction (242) |
| 11. Ozonolysis (198) | 28. Raschig process. (242) |
| 12. Polymerization (199) | 29. Dow process. (243) |
| 13. Wurtz- fittig reaction (210 & 244) | 30. Fittig reaction(244) |
| 14. Friedel crafts reaction (210) | 31. Haloform reaction (247) |
| 15. Friedel crafts reaction acylation (212) | 32. Carbylamine reaction. (248) |
| 16. BHC (215) M24 2M | 33. Chloropicrin (248) |
| 17. Brich reduction(215) | 34. Freons (249) |
| | 35. DDT (250) |

1. An organic compound (A) C_2H_4 decolourises bromine water.(A) on reaction with chlorine gives (B). (A) reacts with HBr to give (C). Identify (A) , (B) and (C).Explain the reactions. (194) **J22 5M**
2. An organic compound (A) of molecular formula C_2H_6O , on heating with conc. H_2SO_4 gives compound (B). (B) on treating with cold dilute alkaline $KMnO_4$ gives compound (C). Identify (A), (B) and (C) and explain the reactions. (197) **J20 5Mi**

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Dedication!**Determination!!****Distinction!!!****ACTC ADVANCED CHEMISTRY TUITION CENTRE, 41/1-PWD ROAD, NAGERCOIL-9940847892****DON'T STRESS!****DO YOUR BEST!!****FORGET THE REST!!!**

3. The simple Aromatic Hydrocarbon compound (A) reacts with Bromine to give (B). Compound (A) reacts with Raney Ni and gives (C). Identify (A), (B) and (C). (211,215) **M19 5Mii**
4. $\text{CH}_3\text{CH}_2\text{Cl} \xrightarrow[\text{430-440K}]{\text{ConcH}_2\text{SO}_4} \text{A} \xrightarrow[\text{HBr Benzoyl peroxide}]{\text{HBr}} \text{B}$ 192, 195 **J23 2MCOM**
5. A simple aromatic hydrocarbon (A) reacts with chlorine to give Compound (B). Compound (B) reacts with ammonia to give Compound (C) which undergoes carbylamine reaction. Identify (A), (B) and (C) and explain the reactions. (242, 243) **J20 5Mii**
6. An organic compound (A) with molecular formula $\text{C}_2\text{H}_5\text{Cl}$ reacts with KOH gives compounds (B) and with alcoholic KOH gives compound (C). Identify (A), (B), and (C). BB **M23 3M**
7. Simplest alkene (A) reacts with HCl to form compound (B). Compound (B) reacts with ammonia to form compound (C) of molecular formula $\text{C}_2\text{H}_7\text{N}$. Compound (C) undergoes carbylamine test. Identify (A), (B), and (C). BB **M22 5M**
8. A hydrocarbon C_3H_6 (A) reacts with HBr to form compound (B). Compound (B) reacts with aqueous potassium hydroxide to give (C) of molecular formula $\text{C}_3\text{H}_6\text{O}$. what are (A) (B) and (C). Explain the reactions. BB
9. Two isomers (A) and (B) have the same molecular formula $\text{C}_2\text{H}_4\text{Cl}_2$. Compound (A) reacts with aqueous KOH gives compound (C) of molecular formula $\text{C}_2\text{H}_4\text{O}$. Compound (B) reacts with aqueous KOH gives compound (D) of molecular formula $\text{C}_2\text{H}_6\text{O}_2$. Identify (A), (B), (C) and (D).
10. Complete the following reactions. (243,244) **M22 2M COMPULSORY**
- i) $\text{C}_6\text{H}_5\text{Cl} + 2\text{NH}_3 \xrightarrow[50\text{atm}]{250^\circ\text{C}} \text{---}$
- ii) $\text{C}_6\text{H}_5\text{Cl} + 2\text{Na} + \text{ClC}_6\text{H}_5 \xrightarrow{\text{Ether}} \text{---}$

“NO PAIN, NO GAIN”.**Never Dreamed about success, Worked for it.****WISH U ALL THE BEST ACTC**

“May God's guidance be with you during the Exam and may you be able to answer each question correctly. My prayers and Blessings are with you”.

- ACTC EMS

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**THANK YOU
TEACHERS, PARENTS, STUDENTS – ACTC**

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