

ACTC ADVANCED CHEMISTRY TUITION CENTRE, NAGERCOIL , KK DIST 9940847892**PLAN!****PREPARE!!****PRESENTATION!!!****PUBLIC EXAM +2 CHEMISTRY EXAM STUDY PLAN 2022 ONE DAY PLAN**

May be

- 5- 10% GOVT PUBLIC EXAM PREVIOUS YEAR QUESTION PAPER - MARCH 2020(M20), JULY 2020 (J20), SEP2020(S20), AUG2021(A21)
- 2-3%GOVT MODEL QUESTION PAPER 2019-20 (GM).
- 3-10% TAMIL NADU STATE TEACHER PARENTS ASSOCIATION 2019-20 PTA 1-6 Question paper (PTA).
- 5-10% first revision question paper 2022, second revision question paper 2022.
- 30-40% Prepare well BOOK BACK- ONEWORD, QUESTION ANSWER
- 40-50% creative questions Text book inside
- Prepare well BOOK BACK, PTA & QR CODE ONEWORD & QA, PTA MODEL Question paper, GOVT MODEL Question paper, Revision exams I & II. PUBLIC QUESTIONS.

Aim: Centum Marks , Study 110 Marks, Write 70 Marks.**DAY 1 PHYSICAL CHEMISTRY 11-05-2022 WEDNESDAY**

| SN | TIME | LESSON | REMARKS |
|----|---------|--|---------|
| 1 | 2-3PM | LESSON 6 BOOK READ , 1mark BB & PTA 1-6 | |
| 2 | 3-4PM | 2 mark, 3 mark,5mark, ACTC question Bank | |
| 3 | 4-5PM | LESSON 7 BOOK READ , 1mark BB & PTA 1-6 | |
| 4 | 5-6PM | 2 mark, 3 mark,5mark, ACTC question Bank | |
| 5 | 6-7 PM | LESSON 8 BOOK READ , 1mark BB & PTA 1-6 | |
| 6 | 7-8 PM | 2 mark, 3 mark,5mark, ACTC question Bank | |
| 7 | 8- 9PM | LESSON 9 BOOK READ , 1mark BB & PTA 1-6 | |
| 8 | 9-10 PM | 2 mark, 3 mark,5mark, ACTC question Bank | |
| 9 | 10-11PM | LESSON 10 1 mark, 2 mark, 3 mark,5mark, ACTC question Bank | |

DAY 2 INORGANIC & ORGANIC CHEMISTRY 12-05-2022 THURSDAY

| SN | TIME | LESSON | REMARKS |
|----|----------|---|---------|
| 1 | 5-6 AM | LESSON 1 1mark,2 mark, 3 mark,5mark, ACTC question Bank | |
| 2 | 6-7 AM | LESSON 2 1mark,2 mark, 3 mark,5mark, ACTC question Bank | |
| 3 | 7-8 AM | LESSON 3 BOOK READ , ALL EQUATIONS , 1mark BB | |
| 4 | 8-9 AM | 2 mark, 3 mark,5mark, ACTC question Bank | |
| 5 | 9-10 AM | LESSON 4 1mark,2 mark, 3 mark,5mark, ACTC question Bank | |
| 6 | 10-11 AM | LESSON 5 BOOK READ , IUPAC name & 1mark BB | |
| 7 | 11- 12PM | 2 mark, 3 mark,5mark, ACTC question Bank | |

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| ACTC PLAN! | | PREPARE!! | | PRESENTATION!!! | |
|-------------------|---------|--|--|------------------------|--|
| 8 | 12-1 PM | LESSON 11 1 mark, 2 mark, 3 mark,5mark, ACTC question Bank | | | |
| 9 | 1-2 PM | LESSON 11 WORK SHEET equations | | | |
| 10 | 2- 3 PM | LESSON 12 1 mark, 2 mark, 3 mark,5mark, ACTC question Bank | | | |
| 11 | 3-4 PM | LESSON 13 1 mark, 2 mark, 3 mark,5mark, ACTC question Bank | | | |
| 12 | 4-5 PM | LESSON 12,13 WORK SHEET equations | | | |
| 13 | 5-6 PM | LESSON 14 1 mark, 2 mark, 3 mark,5mark, ACTC question Bank | | | |
| 14 | 6-7 PM | LESSON 11 TO 13 PROBLEM REVISION, MECHANISM | | | |
| 15 | 7-8 PM | VOLUME 1 & 2 ONE MARK BB, QR, ALL QUESTION PAPER | | | |
| 16 | 8-9 PM | GOVT MODEL, REVISION EXAM Question paper 2022 -I &II | | | |
| 17 | 9-10 PM | LESSON 6 TO 9 PROBLEM REVISION | | | |
| 18 | 10-11PM | PREVIOUS YEAR PUBLIC QUESTIONS 4 QUESTIONS | | | |

| DAY 3 REVISION | | 13-05-2022 | FRIDAY | EXAM DAY |
|-----------------------|-----------|---|---------------|-----------------|
| SN | TIME | LESSON | | REMARKS |
| 1 | 4-5 AM | INORGANIC REVISION FULL REVISE IMPORTANT EQUAT. | | |
| 2 | 5-6 AM | PHYSICAL REVISION , PROBLEM | | |
| 3 | 6- 7AM | ORGANIC REVISION, NAME REACTION | | |
| 4 | 8:30-9:30 | ONE MARK REVISION | | |
| | | ALL THE BEST SCORE CENTUM MARKS | | |

DON'T STRESS !**DO YOUR BEST !!****FORGET THE REST!!!****WE WISH U ALL THE BEST****ACTC****ADVANCED CHEMISTRY TUITION CENTRE**

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ADMISSION OPEN**STATE BOARD & CBSE****+1, +2 CHEMISTRY & X SCIENCE****E.MUTHUSAMY**

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email: actnagercoil@gmail.com**YOU TUBE:** ACTC Chemistry**2022-23 +2 BATCH CHEMISTRY CLASS STARTS FROM 2-06-2022 THURSDAY****E.MUTHUSAMY MSc(Che), MSc(Psy), MEd., MPhil., MA(Eng.), MA(T), MA(PA), MA(Soc), BLISc., DMLT.****You Tube: ACTC Chemistry email: actnagercoil@gmail.com whatsapp: 9940847892**Kindly send me your answer keys to our email id - padasalai.net@gmail.com

REDUCED SYLLABUS +2 CHEMISTRY 2021-22**+2 CHEMISTRY IMPORTANT QUESTION 2022**

(WITH TEXT BOOK PAGE NUMBER)

Important Questions from

- **GOVT PUBLIC EXAM PREVIOUS YEAR QUESTION PAPER - MARCH 2020(M20), JULY 2020 (J20), SEP2020(S20), AUG2021(A21) .**
- **GOVT MODEL QUESTION PAPER 2019-20 (GM).**
- **TAMIL NADU STATE TEACHER PARENTS ASSOCIATION 2019-20 PTA 1-6 Question paper (PTA).**
- **Text book inside**

| LN | MARCH 2020 | | | | JULY 2020 | | | | SEPTEMBER 2020 | | | | AUGUST 2021 | | | | |
|----|------------|----|----|-------------|-----------|----|------|------|----------------|----|----|------|-------------|----|----|------|----|
| | 1M | 2M | 3M | 5M | 1M | 2M | 3M | 5M | 1M | 2M | 3M | 5M | 1M | 2M | 3M | 5M | |
| 1 | 1 | | | 1(5) | 7 | 1 | 1 | 1 | 6 | 2 | 1 | 1(2) | 6 | 1 | | 1(5) | 6 |
| 2 | 1 | | 1C | 1(2) | 6 | 1 | 1C | 1(3) | 6 | 1 | 1 | 1(2) | 6 | 1 | 1 | 1 | 6 |
| 3 | 1 | 1 | | 1(3) | 9 | 1 | 1 | 1(3) | 9 | 1 | 1 | 1(3) | 9 | 1 | 1 | 1(3) | 9 |
| 4 | 1 | 1 | 1 | 1(3) | 6 | - | 1(5) | 5 | 1 | 1 | 1 | 1(3) | 6 | - | 1 | 1(3) | 7 |
| 5 | - | 1 | 1 | 1(2) | 10 | 2 | 1 | 1(2) | 9 | 1 | 1 | 1(5) | 9 | 1 | 1 | 1(2) | 9 |
| 6 | 1 | 1 | | 1(2) | 5 | 1 | 1 | 1(2) | 6 | 1 | 1 | 1(3) | 6 | 1 | 1 | 1 | 9 |
| 7 | 1 | | | 1(5) | 6 | - | 1 | 1(3) | 6 | 1 | 1 | 1(2) | 5 | 1 | | 1(2) | 6 |
| 8 | 1 | 1 | 1 | 1(2) | 8 | 1 | 2 | 1(2) | 10 | 1 | 1 | 1(3) | 9 | 1 | 1 | 1(5) | 8 |
| 9 | 2 | | 1 | 1(3)P RO | 8 | 1 | | 1(5) | 6 | | | 1CP | 1(5) | 8 | 1 | 2 | 1 |
| 10 | - | 1 | 1 | 1(3) | 8 | - | 1 | 1(5) | 7 | 1 | 1 | 1(2) | 8 | 2 | 1 | 1(5) | 9 |
| 11 | 2 | 1C | | 1(2) | 9 | 2 | 1 | 1(5) | 10 | 1 | 1 | 1(3) | 8 | 1 | 1 | 1(2) | 9 |
| 12 | 1 | 1 | 1 | 1(2) | 8 | 1 | 1 | 1(3) | 11 | 1 | 1 | 1(5) | 9 | 2 | 1 | 1(5) | 10 |
| 13 | 1 | 1 | | 1(2) | 8 | 1 | 1 | 1 | 6 | 1 | 1 | 1(3) | 8 | 1 | 1C | 1(5) | 8 |

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| PLAN! | | | | | | PREPARE!! | | | | | | PRESENTATION!!! | | | | | | | |
|-------|---|---|------|-----|----|-----------|---|-----|-----|------|---|------------------|-----|-----|----|---|---|-----|-----|
| 15 | 1 | 1 | 1(2) | 6 | 1 | 1(3) | 6 | 1 | 1 | 1(3) | 7 | REDUCED SYLLABUS | | | | | | | |
| | | | | | | | | | | | | NO QUESTION | | | | | | | |
| 1 | 9 | 9 | 50M | 110 | 15 | 9 | 9 | 50M | 110 | 15 | 9 | 9 | 50M | 110 | 15 | 9 | 9 | 50M | 110 |
| 5 | | | | | | | | | | | | | | | | | | | |

+2 CHEMISTRY GOVT PUBLIC PREVIOUS QUESTION PAPER ANALYSIS

*C- Compulsory CP- COMPULSORY PROBLEM PRO- PROBLEM

| Inorganic | UNIT 1,2,3,4,5 | Physical | Unit 6, 7,8,9,10 | Organic | Unit 11, 12, 13, 14 |
|-----------|----------------|----------|------------------|---------|---------------------|
| 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 |

M20 – MARCH 2020, J20-JULY 2020, S20- SEPTEMBER 2020, A21-AUGUST 2021,
2M- 2 marks; 2MC- 2 marks Compulsory; 3M- 3 marks; 5M- 5 marks;
GM2M- Govt model question paper 2 marks; & PTA Questions

IMPORTANT QUESTIONS-2021-22**LESSON 1 METALLURGY**

- Difference between ore and mineral. (2) BB (S20)2M
- Explain froth floatation.(6) (A21) 5M
- Describe the underlying principle of froth floatation process. (4) PTA 2M
- Give the depressing agents used in the froth floatation process and why we use depressing agents in that process? (OR) Role of depressing agent in froth floatation process?(4) PTA2M
- which type of ores can be concentrated by froth floatation method give two example (J20)
- Explain how gold ore is leached by cyanide process. (4) GM5Mi
- Explain magnetic separation.(6)
- Define the following terms(i) Roasting (6) (ii) Calcination (7) PTA3M
- What is the role of limestone in the extraction of iron from its oxide Fe_2O_3 .(8) (J20) (BB) ANS: Used As Flux. (Govt. key)
- Explain the following terms with suitable example. a)Gangue b) Slag.(BB) PTA3M(S20)
- Explain extraction of copper from copper pyrites.(8) PTA5M i
- CO is reducing agent. Justify with an example.(8)& (LN 2 43) PTA 2M
- How Cr_2O_3 is reduced to Cr by Al powder? (10) PTA 5M ii
- Explain Auto reduction.(10)
- Define refining process(15)
- Write note on distillation, Write note on Liquefaction. (15)
- Explain electro refining process. (15) Explain electrolytic refining of silver. (16) PTA5M ii
- Explain zone refining process.(16) M20 5M, PTA 3M
- Explain Mond process. (Describe the method for refining of Nickel.)(16) PTA5M ii (16)
- Explain Van-Arkel method. (17) & **Revise Book Back (Evaluation) Question Answer**

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LESSON 2 p-block elements -I

1. Explain general characteristics(properties) of p-block elements.(27)
2. Give one example for icosogens, tetragen, pnictogen, chalcogen.(28)
3. What are the anomalous properties of the first elements of the p-block elements.(29) **S20 A21**
4. There is only a marginal difference in decrease in ionization enthalpy from Aluminium to Thallium – Explain why? (30)**M20 Compulsory 3 mark**
5. $AlCl_3$ is more stable whereas $TlCl_3$ is highly unstable. Why? (30) **PTA5M i**
6. What is inert pair effect.(30)
7. Occurrence of Group 13 (Boron group) elements.(31)
8. A hydride of 2nd period alkali metal (A) on reaction with compound of Boron (B) in the presence of ether to give a reducing agent (C). Identify A, B and C. **J20 2M Compulsory**
9. Uses of Boron.(22)
10. Preparation of Boric acid.(34)
11. How will you identify borate radical? Write the reactions involved.(35) **PTA3M, GM2M**
12. How will you convert Boric acid to born nitride?(35) **PTA2M**
13. Structure of Boric acid.(35) Uses of Boric acid.(35)
14. How to prepare potash alum & uses.(40) **J20, PTA 5M ii** What is burnt alum.(40)
15. What is catenation? Describe the catenation property of carbon. Substantiate this statement. (41) **S20** Write any two conditions for catenation. **M20**
16. What are allotropes of carbon, difference between graphite & diamond. (41)
17. Write note on fullerenes, nanotubes, graphene.(43)
18. Explain the preparation, uses of silicone(47 & 48)
19. What are the types, properties of silicones. (47)

ALL CHEMICAL EQUATION & Revise Book Back (Evaluation) Question Answer

LESSON 3 p-block elements -II

1. Occurrence of 15th group elements. (57)
2. How will you prepare nitrogen from sodium azide and atmospheric air? (57)
3. N_2 is a chemically inert. Why? (58)
4. Write note on Haber's process (58) **S20**
5. How is ammonia prepared in the laboratory? (58)
6. What is the reaction of Ammonia with Iron and copper salts? (60) **PTA5M ii**
7. Structure of Ammonia. (60)
8. Explain Allotropy of phosphorus.(67)
9. How does phosphorous act as a reducing agent? (68) Complete the reaction: $P_4 + NaOH + H_2O \rightarrow$ (68) **PTA 2MC**
10. Uses of phosphorus. (68)
11. Write the structure and basicity of following oxy acids. (72) **3M**
 - i) hypo phosphoric acid
 - ii) ortho phosphoric acid
 - iii) pyro phosphoric acid
12. Allotropic form of sulphur.(73)
13. How is ozone estimated? (75) (Ozone (O_3) act as a powerful oxidizing agent why?)
14. Laboratory preparation of O_2 . (74)
15. Laboratory Preparation of ozone, Structure of ozone(74)
16. Ozone (O_3) acts as a powerful oxidizing agent why? (75) **PTA2M**
17. Uses of oxygen(75)

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18. Lab preparation of SO_2 . (76) Explain the bleaching action of Sulphur dioxide. (77) **A21**
19. Write note on contact process. (77)
20. Structure of SO_2 , Uses of SO_2 . (77).
21. SO_2 is an acidic or basic oxide. Why? (76)
22. Draw the structure of oxoacids of phosphorous, Oxidation number (72)
23. Draw the structure of oxoacids of sulphur. (80)
Sulphurous acid, sulphuric acid, Marshall's acid (**M20**), Caro's acid, Dithionic acid.
(Write the molecular formula and draw the structure of sulphurous acid and Marshall's acid.) (**M20**)
24. Occurrence of 17th group elements. (81)
25. Why fluorine is more reactive than other halogens? (BB98) **PTA1 2M & pta3 5M i**
26. How will you prepare chlorine in the laboratory? (82BB83) **2M**
27. Deacon process (83)
28. Give the balanced equation for the reaction between chlorine with Cold NaOH and hot NaOH. (84) **S20**
29. Write about bleaching action of chlorine (85)
30. How will you prepare bleaching powder? (85) **M20** Uses of chlorine. (86)
31. What are interhalogen compound. Give two examples. (89) **GM5Mi A21**
32. What are the properties of interhalogen compounds. (89) **PTA5M**
33. Give reasons: ICl is more reactive than I_2 . **PTA5M i**
34. Structure of interhalogen compounds AX , AX_3 , AX_5 , AX_7 . (90)
35. What type of hybridisation is found in the following? (a) BrF (b) BrF_5 (c) BrF_3 (d) IF_7 (91) (**J20**) **3M, PTA 5M ii**
36. Occurrence of 18th group elements. (91)
37. Physical properties of 18th group elements. (91)
38. How does XeF_6 react with NaOH? (92)
39. How does XeF_6 react with SiO_2 ? (92)
40. How does sodium per xenate act as strong oxidizing property? (92)
41. Uses of Helium (93) **GM 3M, S20, A21, PTA 3M**
42. Uses of Neon, Argon. (93) **PTA 3M**, Krypton, Uses of Xenon, Radon. (93).
43. List any five compounds of xenon and mention the type of hybridization and structure of the compounds. (93) **PTA5M**

ALL CHEMICAL EQUATION & Revise Book Back (Evaluation) Question Answer**LESSON 4 Transition and inner transition elements (d and f block elements)**

- What are transition elements? Write two characteristics of the transition elements? (102) **PTA5Mi**
- Write general Electronic configuration of d-block, f-block elements.
- Classify the following elements into d-block and f-block elements: (**M20**)
i) Tungsten ii) Ruthenium iii) promethium iv) Einsteinium
- Why there is a slight variation in the atomic radii from Cr to Cu? (104)
- Applying Aufbau principle, write down the electronic configuration of Cr^{3+} and Cu. (102)
- What are the metallic behavior of d-block elements. (102)
- Transition metals show high melting points. Why? (103) **PTA 2MARK**
- d-block elements have variable oxidation state. Why? (106) **PTA 2MARK**
- Write a note about oxidation state of 3d series. (106)
- Mn^{2+} is more stable than Mn^{4+} . Why? (106)

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ACTC ADVANCED CHEMISTRY TUITION CENTRE, NAGERCOIL , KK DIST 9940847892**PLAN!****PREPARE!!****PRESENTATION!!!**

11. Ru and Os have highest oxidation state in which compounds? Explain with example.(106)
 12. Which metal in the 3d series exhibits +1 oxidation state most frequently and why?(106-107)

S20 3MARK

13. Define – Standard electrode potential.(107)
 14. Explain why Cr^{3+} is strongly reducing while Mn^{3+} is strongly oxidizing? (108) **PTA 5M i**
 15. Write note on diamagnetic. Give example.(109)
 16. Write note on paramagnetic. Give example.(109)
 17. Sc^{3+} , V^{5+} are diamagnetic. Give reason. (110)
 18. Calculate the magnetic moment of Ti^{3+} & V^{4+} . (110)
 19. Calculate the number of unpaired electrons in Ti^{3+} , Mn^{2+} and calculate the spin only magnetic moment.(110) **A21, PTA 3MARK**
 20. Most of the transition metals act as catalyst. Justify this statement.(110) **PTA 3M**
 21. Explain the catalytic hydrogenation of alkene to alkane with equation. (110)
 22. What is Zeigler – Natta catalyst? In which reaction it is used? Give equation.(110)
 23. Hume-Rothery rule. (110)
 24. d-block elements readily form Alloy. Give reason.(111)
 25. d-block elements formation of interstitial compounds(What are interstitial Compound)(111) (What are interstitial compounds? How they differ from the properties of its pure metals?)(111) **S20, A21 2MARK, PTA 3MARK**
 26. What is the property of interstitial compounds? (111)
 27. d-block elements readily form complexes. Give reason. (111)
 28. Justify the position of Lanthanoids and Actinoids in the periodic table.(BB)(118) **PTA 5M i**
 29. Electronic configuration of Lanthanoids.(120)
 30. Oxidation state of Lanthanoids.(120)
 31. Define, cause and consequences of Lanthanoid contraction.(121) **J20 5MARK, PTA 3M**
 32. Which is more basic among $\text{Lu}(\text{OH})_3$ and $\text{La}(\text{OH})_3$? Why?(BB) (121) **2M**
 33. Electronic configuration of actinoids.(122)
 34. Oxidation state of actinoids.(123)
 35. Differences between Lanthanoids and Actinoids.(123) **PTA 5MARK**
 36. Write down the electronic configuration of Gd(Z=64), Th(Z=90).

& **Revise Book Back (Evaluation) Question Answer**

LESSON 5 Coordination Chemistry

1. Difference between double salt and coordination compounds.(131) (**A21, PTA 3M**)
 2. Explain Werner theory & limitation.(132) (**S20**)
 3. Write note on coordination entity, Define central metal ion, ligand, coordination number, oxidation number, coordination sphere, coordination polyhedron.(134)
 4. In the complex $[\text{Pt}(\text{NO}_2)(\text{H}_2\text{O})(\text{NH}_3)_2]\text{Br}$ identify the following i) central metal ion, ii) Ligand iii) coordination entity iv) oxidation number of the central metal ion. V) coordination number.
 5. Write the IUPAC name of the following: a) $[\text{Ag}(\text{NH}_3)_2]^+$ B) $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ (**M20**)
 6. Write the IUPAC Name for the compound $\text{Na}_2[\text{Ni}(\text{EDTA})]$ (140) **PTA 5M i**
 7. For the example $[\text{Fe}(\text{en})_2\text{Cl}_2]\text{Cl}_2$, Identify **PTA 5M i**
 1) Oxidation number of Fe, 2) Hybridization and shape
 3) Magnetic behavior, 4) Number of geometric isomers
 5) Whether there may be optical isomer also? 6) IUPAC name

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8. Classification based on the net charge on the complex, Classification based on kind of ligands.(135)
9. Nomenclature of coordination compounds IUPAC Names(138-141)
10. Explain Valence Bond theory (VB Theory) & limitations.(S20, PTA)(149 &152)
11. Apply VB theory in $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$ (S20), $[\text{Co}(\text{CN})_6]^{3-}$, $[\text{Co}(\text{F})_6]^{3-}$ (M20) (149-151)

ALL IUPAC Name, Apply VB Theory & Revise Book Back (Evaluation) Question Answer

PHYSICAL CHEMISTRY LESSON 6 SOLID STATE

1. Write General characteristics of solids.(177)
2. Difference between crystalline solids and Amorphous solids.(178)PTA 3M
3. Define Isotropy and anisotropy.(178) (S20)
4. Explain ionic solids. (Introduction, NaCl diagram, Characteristics)(179)
5. What are the characteristics of Ionic solids? (179) PTA 5M i
6. Explain covalent solids molecular solids, Metallic solids? (180)
7. Classify the following into covalent, molecular, ionic and metallic solids.(A21) 3MARK C
(i) Diamond (ii) Brass (iii) NaCl (iv) Naphthalene (v) Glucose (vi) SiO_2
8. Define unit cell. (180)
9. What is meant by term "Coordination Number"? What is the Coordination Number of atoms in a bcc structure? (180) A21 3MARK
10. Define the terms crystal lattice and unit cell. (180) PTA3M
11. Write note on SC, BCC. (183)
12. Sketch Face Centered cubic unit cell(FCC) and Calculate the number of atoms present in it. (184) PTA3M
13. What is Bragg's equation? (184) PTA 2M
14. Barium has a body centered cubic unit cell with a length of 508pm along an edge. What is the density of barium in g cm^{-3} ? (185)
15. An element has a face centered cubic unit cell with a length of 352.4 pm along an edge. The density of the element is 8.9 g cm^{-3} . How many atoms are present in 100 g of an element. (186)
16. What is packing efficiency? (187) PTA 5M ii
17. How will you calculate the packing efficiency for simple cubic?(187)
18. Calculate the percentage efficiency of packing in body centered cubic system (188)PTA3M
19. Outline the classification of point defects. (193) PTA5M ii
20. Explain Schottky defect (GM5M, S20)& Frenkel defect.(M20,PTA3M)(Stoichiometric defects) (193)
21. Explain 'f' centers with a neat diagram.(194) PTA5M ii
22. Explain Metal excess defect, metal deficiency defect. (Non-Stoichiometric defects) (194)
23. Write note on Impurity defect. (195)
24. Atoms X and Y form BCC crystalline structure. Atom X is present at the corners of the cube and Y is at the centre of the cube. What is the formula of the compound? (BB)PTA 5M i
25. An atom crystallizes in FCC crystal lattice and has a density of 10 g cm^{-3} with unit cell edge length of 100pm. Calculate the number of atoms present in 1g of crystal. (BBQ₂₂201) 5M
26. A face centred cubic solid of an element (atomic mass 60 g mol^{-1}) has a cube edge of 4Å . Calculate its density.(186) GM3M

ALL INSIDE PROBLEM & Revise Book Back (Evaluation) Question Answer

LESSON 7 CHEMICAL KINETICS

1. Define average rate and instantaneous rate. (BB)207

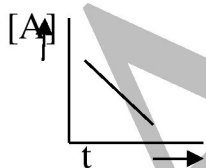
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ACTC ADVANCED CHEMISTRY TUITION CENTRE, NAGERCOIL, KK DIST 9940847892**PLAN!****PREPARE!!****PRESENTATION!!!**

2. Define rate law and rate constant. (BB)208
3. Give the difference between rate of a reaction and rate constant.(209) **PTA,A21**
4. Explain the rate determining step with an example. (210) **PTA 3M**
5. Give the differences between order and molecularity of a reaction. (210)
6. The rate of the reaction $x + 2y \rightarrow \text{product}$ is $4 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$, if $[x] = [y] = 0.2\text{M}$ and rate constant at 400k is $2 \times 10^{-2}\text{s}^{-1}$, what is the overall order of the reaction?(211) **(J20) 2 MARK**
7. Derive integrated rate law for a first order reaction $A \rightarrow \text{product}$.(212) **(PTA,M20) 5MARK**
8. Derive and describe the graphical representation of first order reaction.(212)
9. Explain pseudo first order reaction with an example. (214)**GM3M**
10. Derive integrated rate law for a zero order reaction $A \rightarrow \text{product}$ & Example (214)**A21**
11. Define half life period of reaction. Show that for a first order reaction half life period is independent of initial concentration. (215) **PTA 5M i**
12. Calculate the half period for a zero order reaction.(215)**PTA 2M**
13. Write Arrhenius equation and explains the terms involved. (220)
14. Write the rate law for the following reactions. (BB)
 - (a) A reaction that is $3/2$ order in x and zero order in y .
 - (b) A reaction that is second order in NO and first order in Br_2 .
15. The rate constant for a first order reaction is $1.54 \times 10^{-3} \text{ s}^{-1}$. Calculate its half life time. **(PTA, J20)**
16. Identify the order for the following reactions (BB)
 - (i) Rusting of Iron
 - (ii) Radioactive disintegration of ${}_{92}\text{U}^{238}$
 - (iii) $2\text{A} + 3\text{B} \rightarrow \text{products}$; rate $= k [\text{A}]^{\frac{1}{2}}[\text{B}]^2$
17. Write any three differences between order and molecularity.(210) **5M i**
18. Derive Arrhenius equation to calculate activation energy from the rate constant k_1 and k_2 at temperature T_1 and T_2 respectively.(220,221) **PTA3MC**
19. The rate of formation of dimer in a second order reaction is $7.5 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$ at 0.05 mol L^{-1} monomer concentration. Calculate the rate constant. (BB) **5M i**
20. For the general reaction $\text{A} \rightarrow \text{B}$. Plot of concentration of A Vs time is given in the graph below. Answer the following Questions on the basis of this graph. (214) **PTA3M**
 - i) What is the order of the reaction?
 - ii) What is the slope of the curve?
 - iii) What is the Unit of rate constant?



21. a first order reaction is 40% complete in 50 minutes. Calculate the value of the rate constant. In what time will the reaction be 80% complete? (BBQ₃₀231) **GM5Mi**

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LESSON 8 IONIC EQUILLIBRIUM

1. Mention the Arrhenius concept of acid and base (2) limitations of Arrhenius concepts? (3)
2. Classify acid or base using Arrhenius concept. HNO_3 , CH_3COOH , $\text{Ba}(\text{OH})_2$, $\text{H}_3\text{PO}_4(3)$
3. Define Lowery - Bronsted concept of acids and bases (3)
4. 0.1 M Solution of HF is weak acid. But 5M solute ion of HF is stronger acid. Why? **PTA3M**
5. What are conjugate acid – base pairs? Give example. (3) **PTA5M ii**
6. Write a balanced equation for the dissociation of the following in water and identify the conjugate acid-base pairs. i) NH_4^+ ii) H_2SO_4 iii) CH_3COOH iv) HCl v) HF (4)

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7. Classify the following into Lewis acids and Lewis bases. **S20 5Mi**
 A) BF_3 (B) CO_2 (C) MgO (D) CH_3^-
8. What are Lewis acids and bases? Give two example (4) **M20 2MARK**
9. Difference between Lewis acids and Lewis base. (5)
10. Identify the Lewis acid and the Lewis base in the following reactions. (5)
 $\text{Cr}^{3+} + 6\text{H}_2\text{O} \rightarrow [\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
11. Identify the Lewis acid and Lewis base in the following reactions. (5)
 i) $\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$ ii) $\text{CH}_3\text{-O-CH}_3 + \text{AlCl}_3 \rightarrow (\text{CH}_3)_2\text{O} \rightarrow \text{AlCl}_3$
12. H_3BO_3 accepts hydroxide ion from water as shown below. (6)
- $$\text{H}_3\text{BO}_{3(\text{aq})} + \text{H}_2\text{O} \rightleftharpoons \text{B}(\text{OH})_4^- + \text{H}^+$$
- Predict the nature of H_3BO_3 using Lewis concept.
13. Identify the conjugate Acid Base pair for the following reactions in aqueous solution. (30) **BB J20 5Mii**
 (A) $\text{HS}^-_{(\text{aq})} + \text{HF} \rightleftharpoons \text{F}^-_{(\text{aq})} + \text{H}_2\text{S}_{(\text{aq})}$
 B) $\text{HPO}_4^{2-} + \text{SO}_3^{2-} \rightleftharpoons \text{PO}_4^{3-} + \text{HSO}_3^-$
14. Define ionic product of water. Give its value at room temperature (7) **S20, PTA 3MARK**
15. Calculate the concentration of OH^- in a fruit juice which contains $2 \times 10^{-3}\text{M}$, H_3O^+ ion. Identify the nature of the solution. (8)
16. Derive the relationship between pH and pOH. (9,10) **PTA 5M i**
17. Write the pH value of the following substances: **M20 5Mi**
 A) Vinegar B) Black coffee C) Baking Soda D) Soapy Water
18. Calculate the pH of 10^{-7}M HCl . (11) **PTA 3M**
19. State Ostwald's dilution law. Derive an expression Ostwald's dilution law. (12) **J20 3MARK, PTA 3MARK**
20. A solution of 0.10M of a weak electrolyte is found to be dissociated to the extent of 1.20% at 25°C . Find the dissociation constant of the acid. (14)
21. Calculate the pH of 0.1M CH_3COOH solution. Dissociation constant of acetic acid is 1.8×10^{-5} . (15)
22. Define common Ion effect with an example (15) **J20, PTA 2MARK**
23. What are buffer solutions? Mention its types (16)
24. What are the two types of buffer solution? Give example for each type. (16) **PTA 5M ii**
25. Explain the buffer action of a solution (16) **J20 2MARK**
26. Explain buffer action of acidic buffer. (16) **PTA 3M**
27. Derive Henderson-Hasselbalch equation (Derive Henderson equation) (18) **M20, GM 3M**
28. Find the pH of a buffer solution containing 0.20 mole per litre sodium acetate and 0.18 mole per litre acetic acid. K_a for acetic acid 1.8×10^{-5} . (19) **A21 3MARK**
29. Define solubility product (25). Give a condition for a compound to be precipitated (25)
30. How will you calculate solubility product from molar solubility? (26) **PTA 5M ii**
31. Write the expression for the solubility product of $\text{Ca}_3(\text{PO}_4)_2$, BaSO_4 . (26)
32. Define solubility product of a compound. (25) **2M**
33. The K_a value of HCN is 10^{-9} . What is the pH of 0.4M HCN solution? (31) **PTA 5M**
34. 50ml of 0.05M HNO_3 is added to 50ml of 0.025M KOH . Calculate the pH of the resultant solution. (BBQ₁₅31) **GM 2MC**
35. K_{SP} of Ag_2CrO_4 is 1.1×10^{-12} . What is the solubility of Ag_2CrO_4 in 0.1M K_2CrO_4 ? (BBQ₂₅31) **GM 5Mii**

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1. A conductivity cell has two platinum electrodes separated by a distance 1.5 cm and the cross sectional area of each electrode is 4.5sq cm. Using this cell, the resistance of 0.5N electrolytic solution was measured 15Ω. Find the specific conductance of the solution. (36) **M20 2M**
2. Define molar conductivity. (36)
3. Define molar conductance and specific conductance How they are related? (36) **PTA5M i**
4. Define Equivalent conductance. (37) **A21 2M**
5. Factors affecting electrolytic conductance.(37) **A21 2M**
6. Explain measurement of conductivity of ionic solutions.(38)
7. Why is AC current used instead of DC in measuring the electrolytic conductance? (38) (BBQ₁₁66) **PTA 5Mii**
8. Explain variation of molar conductivity with concentration.(39)
9. State Kohlrausch's law and applications. (41) **J20 5MARK, GM 5Mii**
10. What is the role of salt bridge in Galvanic cell? (46) **PTA5M ii**
11. What are the conventions used in Galvanic cell notation. (46) **PTA 5M i**
12. Write note on standard hydrogen electrode(SHE). (48) **PTA3 3M & PTA5 5M i**
13. Explain Thermodynamics of cell reactions. (50)
14. Derive Nernst equation. (51) **S20 5MARK**
15. Explain Electrolytic cell and electrolysis. (53)
16. State Faraday's law of electrolysis First law, Second law. (54) **A21 3MARK GM 3M**
17. A solution of silver nitrate is electrolyzed for 30 minutes with a current of 2 amperes. Calculate the mass of silver deposited at the cathode.(55) **S20 3MARK COMPULSORY**
18. Write note on Electrochemical series.(62)
19. What are electrochemical series? How is it useful to predict corrosion?(62) **PTA3M**
20. The reaction $Zn(s) + Co^{2+} \leftrightarrow Co(s) + Zn^{2+}$ occurs in a cell. Compute the standard emf of the cell. Given that $E^\circ_{Zn/Zn^{2+}} = + 0.76V$ and $E^\circ_{Co/Co^{2+}} = + 0.28V$. **PTA2MC**
21. Reduction potential of two metals M_1 and M_2 are $E^\circ_{M_1^{2+}/M_1} = -2.3 V$ and $E^\circ_{M_2^{2+}/M_2} = 0.2 V$. Predict which one is better for coating the surface of iron. Given: $E^\circ_{Fe^{2+}/Fe} = -0.44 V$ (BBQ₁₇66) **PTA5M ii**
22. Is it possible to store copper sulphate in an iron vessel for a long time? Given $E^\circ_{Cu^{2+}/Cu} = 0.34 V$ and $E^\circ_{Fe^{2+}/Fe} = -0.44V$ (BBQ₁₅66) **PTA2M**
23. Calculate Λ° CH₃COOH using appropriate molar conductance of the electrolytes listed below at infinite dilution at 25°C (BBQ₅63) **PTA5M i**

| Electrolyte | NaCl | HCl | CH ₃ COONa |
|--|-------|-------|-----------------------|
| Λ° (S cm ² mol ⁻¹) | 126.5 | 426.2 | 91.0 |
24. The equivalent conductance of M/36 solution of a weak monobasic acid is 6 mho cm² equiv⁻¹ and at infinite dilution is 400 mho cm² equiv⁻¹. Calculate the dissociation constant of this acid. (BBQ₁₇64) **PTA2MC**

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1. Define adsorption and absorption. (70)

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2. Characteristics of adsorption. (71) **PTA 2M**
3. Distinction between chemical and physical adsorption. (71) **PTA 5Mi**
4. Explain Factors affecting adsorption. (72)
5. Write note on Adsorption and isobars.(73) Explain Freundlich adsorption isotherm and limitations.(73)
6. Define catalyst and catalysis.(77)
7. Define homogenous catalysis & example, heterogeneous catalysis & example(77)
8. What are the characteristics of catalysis? (78) **J20 5MARK, PTA 5Mi**
9. Define promoters, catalytic poison with suitable example (79) **PTA 2M**
10. Define auto catalysis and example (79)
11. Identify the auto catalyst in the following reaction. (79) **J20 5Mi**
 A) $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH}$ B) $2\text{AsH}_3 \rightarrow 2\text{As} + 3\text{H}_2$
12. Define positive catalysis (77) negative catalysis and example(79)
13. Explain intermediate compound formation theory & limitations.(80) **GM 5Mi**
14. Explain adsorption theory.(81) **A21 5MARK**
15. What is the role of adsorption in the heterogeneous catalysis?(81) **PTA 3M**
16. What are active centres? (82) **PTA 2M**
17. Define colloid & particle size.(86)
18. Define dispersed phase and dispersing medium. (86)
19. Define lyophilic colloids & example(87)
20. Define lyophobic colloids & example (87)
21. Explain the classification of colloids based on the physical state.(87)
22. Write the dispersed phase and dispersion medium of butter. (88) **M20 2MARK**
23. Write note on preparation of Colloids- mechanical dispersion.(88)
24. Write note on preparation of Colloids- electro dispersion.(89)
25. Write note on preparation of Colloids- Ultrasonic dispersion.(89)
26. Peptising agent is added to convert precipitate into colloidal solution. Illustrate with an example. 90 (BB103) **PTA 2M** (Write note on preparation of Colloids- peptisation.)
27. Write any three condensation methods of preparation of colloids. (Chemical method) (90) **PTA5M i**
28. What happens when hydrogen sulphide gas is passed through a solution of arsenic oxide? Name the chemical method. (90) **PTA 2M**
29. Write note on Dialysis.(91) , Electrodialysis.(91)
30. Write note on Ultrafiltration.(91) **GM5Mii**
31. Mention the shapes of the following colloidal particles. (93) **M20 3MARK**
 i) As_2S_3 ii) Blue gold sol iii) Tungstic acid sol
32. Define Tyndall effect. (93) **J20 2M**
33. Define Brownian movement.(94)
34. What is the significance of Brownian movement? (94) **PTA 5M ii**
35. Write note on Helmholtz double layer.(94) **PTA 3M**
36. Explain Electrophoresis.(94) **PTA 5Mi**
37. Define electroosmosis. (95)
38. Define coagulation. Various method of coagulation. (96)
39. What is flocculation value? (96) **PTA 2M**
40. Define Gold number.(96)

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& Revise Book Back (Evaluation) Question Answer**ORGANIC CHEMISTRY LESSON 11 Hydroxy compounds and ethers**

- Classification of alcohol.(105)
- Write the IUPAC names of the following compounds. **PTA2M**
 - $C_6H_5 - O - CH_2 - CH - CH_3$ (134M)
 - $CH_2 = CH - CH_2 - CH_2OH$ (107M)
 - $$\begin{array}{c} | \\ CH_3 \end{array}$$
 iii) Neopentyl alcohol (106) iv) Glycerol (107)
- Write all the possible isomers of an alcohol having molecular formula $C_5H_{12}O$.(107)
- Structure of alcohol.(107)
- Preparation of primary, secondary, Tertiary alcohol(108)
- Propene to 2-propanol.(107)
- Formaldehyde to primary alcohol (Formaldehyde to ethanol).
(Formaldehyde + $C_6H_5MgBr \rightarrow ?$) (108)
- Acetaldehyde to secondary alcohol (Acetaldehyde to isopropyl alcohol)
(Acetaldehyde + $CH_3CH_2MgBr \rightarrow ?$)(108)
- Acetone to Tertiary alcohol (Acetone to tert-butyl alcohol)
(Acetone + $CH_3CH_2CH_2CH_2MgBr \rightarrow ?$) (108)
- Ethyl methanoate to isopropyl alcohol. (108)
- How will you prepare the following by using Grignard reagent? **M20 5M ii**
 - Propan-1-ol
 - propan-2-ol
- Write note on Hydroboration.(109)
- Crotonaldehyde to crotyl alcohol. (109)
- Benzyl alcohol to benzaldehyde(109)
- What is Baeyer's reagent? How it is useful to convert ethane to ethane-1, 2-diol?**S20 5Mi**
(What happens when ethylene reacts with cold dilute alkaline $KMnO_4$?) (110)
- Write note on saponification. (110)
- Lucas test for primary, secondary, tertiary alcohol. (110) **J20 5MARK, S20 5M i**
- Victor Meyer test for primary, secondary, tertiary alcohol. (111)
- State Saytzeff's rule.(2, 3-dimethylpentan-3-ol)114
- Swern oxidation.(117) **PTA 5M i**
- Biological oxidation(118)
- Esterification.(118)
- Oxidation primary, secondary alcohol, Tertiary alcohol.(117)
- Is it possible to oxidize t-butyl alcohol using acidified dichromate to form a carbonyl compound? (BB142) **PTA2M**
- $Cu/573K$ of primary, secondary alcohol, Tertiary alcohol.(118)
- Glycol to ethene, Glycol to dinitroglycol.(119)
- Glycol to oxirane, glycol to acetaldehyde.**A21 3M i** (119)
- Write the reaction of ethylene glycol with $Con H_2SO_4$? (120)
- Oxidation of Ethylene glycol. (120)
- Write the chemical equation for oxidation of ethylene glycol with periodic acid.(120) **PTA 2M**
- Glycerol to TNG. (121)

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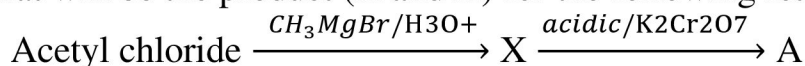
32. What happens when glycerol reacts with KHSO_4 ? (121) (Glycerol to Acrolein) **A21 3Mi GM 3M PTA5Mi**
33. Oxidation of glycerol (121)
34. What is meant by glycerose. (121)
35. Uses of glycerol. (122)
36. *Preparation of phenol*
From chlorobenzene – Dow process, From benzene sulphonic acid, From aniline, From benzene or cumene
37. **Chemical properties of phenol**
Zn, NH_3 / Anhydrous ZnCl_2 , CH_3COCl , $\text{C}_6\text{H}_5\text{COCl}$, NaOH / CH_3I , Oxidation - Acidified $\text{K}_2\text{Cr}_2\text{O}_7$, Reduction – $\text{Ni}/160^\circ\text{C}$, Nitrosation – $\text{HNO}_2/278\text{K}$, 20% $\text{HNO}_3/298\text{K}$, Conc HNO_3 / Conc H_2SO_4 , Sulphonation – Conc. H_2SO_4 , $\text{Br}_2/\text{H}_2\text{O}$, Br_2/CCl_4 / 278K , Kolbe (or) Kolbe Schmitt reaction,
38. Riemer-Tiemann reaction, **PTA 5M i** Phtalein reaction.
39. Schotten – Baumann reaction. (127) **PTA 5M i**
40. Test to differentiate alcohol and phenols, Uses of phenol
41. Give the coupling reaction of phenol. (131) **M20 5Mi**
42. How the following conversions are effected? **GM 5M**
i) phenol to salicylaldehyde (130)
ii) phenol to phenolphthalein (131)
iii) Glycol to 1,4 dioxane (120)
43. Acidity of phenol. (124)
44. Why is C – O – C bond angle in ether slightly greater than the tetrahedral bond angle? (133)
M20 2MARK COMPULSORY
45. Preparation of ether (134)
46. Chemical properties of ether. (136)
47. Explain auto oxidation of ethers. (137) **S20 5M ii**
48. Mention the mechanism in the following reactions: (137) **J20 3MARK**
(a) One mole of HI reacts with methoxy ethane **ANS: S_N^2**
(b) One mole of HI reacts with 2-methoxy 2-methyl propane **ANS: S_N^1**
49. Electrophilic substitution reactions. (137)
50. Give the uses of diethyl ether. (138) **A21 5Mii**
51. An ether (A) $\text{C}_6\text{H}_{12}\text{O}$ when heated with excess of hot concentrated HI, produced two alkyl halides, which on hydrolysis forms compound (B) and (C). Oxidation of (B) gives an acid (D) whereas oxidation of (C) gives ketone (E). Identify A, B, C, D and E and write the chemical equation. **PTA 5M**
52. Anisole $\xrightarrow{t\text{-butylchloride AlCl}_3}$ A $\xrightarrow{\text{Cl}_2/\text{FeCl}_3}$ B $\xrightarrow{\text{HBr}}$ C. Complete the above reaction and Find A, B, C. (BB142) **PTA3M**
53. Dehydration of glycerol (121) **5M ii**
54. How will you prepare 2-methyl hexan-2-ol from Grignard reagent? (108) **3M**
55. Write the mechanism of acid catalysed dehydration of ethanol to give ethene. (115) **5M i**
56. What are the tests to differentiate ethanol and phenols? (131) **3M**
57. An organic compound (A) – $\text{C}_3\text{H}_8\text{O}_3$ used as a sweetening agent, which on oxidation with Fenton's reagent gives a mixture of compounds B and C. Identify A, B and C. Write possible reactions. **3MC(121,122)**

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58. Give four uses of diethyl ether. (138) **2M**

59. What will be the product (X and A) for the following reaction? **5M ii** (BBQ₂₂143)



60. The major product formed when 1-ethoxy prop-1-ene is heated with one equivalent of HI (BBQ₂142) **PTA 3Mi**

61. What happens when 1-phenyl ethanol is treated with acidified KMnO₄? (BBQ₉142) **PTA 3Mii**

62. An organic compound C₂H₆O (A) heated with Con H₂SO₄ at 443K to give an unsaturated hydrocarbon C₂H₄ (B), which on treatment with Bayer's reagent to give compound C₂H₆O₂ (C) which is used as antifreeze in automobile radiator. Compound (C) distilled with con H₂SO₄ to give cyclic compound C₄H₈O₂ (D). Compound (A) is heated with Con H₂SO₄ at 413K to give compound C₄H₁₀O (E). Identify Compounds (A) to (E) and write equations. **PTA 5M**

63. How the following conversions are effected? **G 5M**

i) phenol to salicylaldehyde (130)

ii) phenol to phenolphthalein (131)

i) Glycol to 1,4 dioxane (120)

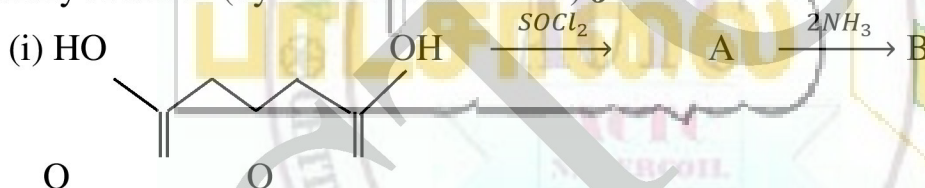
LESSON 12 Carbonyl compounds and carboxylic acid

- How will you prepare ethanal by ozonolysis? (149)
- How are the following conversions effected? **PTA 2M**
 - Hex-3-yne \rightarrow hexan-3-one (150 model)
 - benzaldehyde \rightarrow 2-hydroxy phenyl acetic acid. (BBQ₈193)
- Rosenmund reduction (151)
- Name the catalyst used in Rosenmund reduction and state its importance. (151) **M20 2M**
- How is the following conversion affected? Hex-4-enitrile \rightarrow hex-4-enal (151) **PTA 5M ii**
- Stephen's reaction (151)
- Etard reaction (151) **PTA 3M**
- Gattermann Koch reaction (151)
- Friedel crafts acylation (151)
- How is benzaldehyde manufactured commercially? (152)
- How are the following conversions affected? **5M ii**

(X) Benzene \rightarrow acetophenone (153) (Y) Benzaldehyde \rightarrow hydrobenzamide (159)
- How will you prepare aldimine? (158)
- What is Urotropine? How it is prepared? and uses (158) **J20 2M**
- Popoff's rule (159)
- Clemmensen reduction (160)
- Wolf kishner reduction (161)
- Haloform reaction (161)
- Crossed aldol condensation (162)
- What happens on heating of aldol? (161)
- Explain Aldol condensation with mechanism (161) **S20 5M GM 3M**
- Explain Cannizaro reaction with mechanism (163) **PTA 3M**
- Claisen Schmidt condensation (163)
- Crossed cannizaro reaction (164)

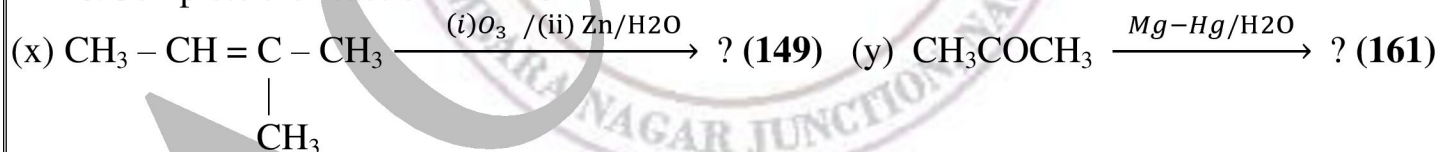
24. Perkin's reaction (165)
25. Knoevenagel reaction (165) **PTA 3Mi**
26. How will you convert benzaldehyde into the following compounds? (165) **A21 5M**
- (i) Benzoin (ii) Cinnamic acid (iii) Malachite green **PTA 2M**
27. Note on Schiff's base (165)
28. Test for aldehyde (166)
29. What is Formalin? What is its use? (167) **M20 5Mi**
30. How will you prepare benzoic acid from toluene? (171) **PTA 3M i**
31. What happens when ethanoic acid reacts with ethanol in the presence of conc. H_2SO_4 . Give its complete mechanism. (173) **5M i**
32. How does sodium salt react with soda lime? (175)
33. HVZ reaction (176)
34. Formic acid reduces Tollens reagent whereas acetic acid does not reduce. (177) **M20 3M**
35. uses of formic acid (188)
36. test for carboxylic acid (177) **J20, A21 3M**
37. Why formic acid act as strong reducing agent? Give one equation to show its reducing property. (177) **2M**

38. Identify A and B (by bond line structure) **J20 5Mi**



39. Effect of substituents on the acidity of carboxylic acid. (178)

40. Complete the reaction **PTA 5M ii**



41. An organic compound C_2H_5Br (A) on treatment with Mg in dry ether gives (B) which on treatment with CO_2 followed by acidification gives (C). Identify (A), (B) & (C) and write possible equations. **PTA 3MC**

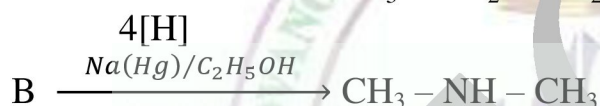
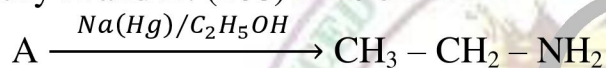
42. Compound A of molecular formula C_7H_6O reduces Tollen's reagent when A reacts with 50% NaOH gives compound B of molecular formula C_7H_8O and C of molecular formula $C_7H_5O_2Na$. Compound C on treatment with dil HCl gives compound D of molecular formula $C_7H_6O_2$. When D is heated with sodalime gives compound E. Identify A, B, C, D & E. Write the corresponding equations. (163) **GM 5M**

LESSON 13 Organic Nitrogen Compounds

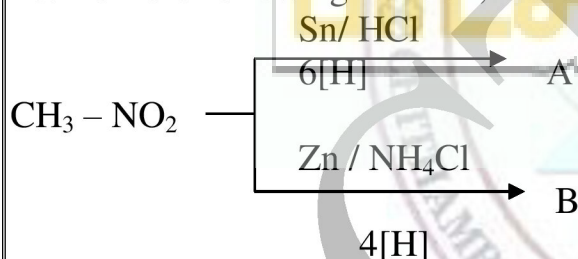
1. Explain Isomerism of nitro compound? (199)
2. There are two isomers with the formula CH_3NO_2 . How will you distinguish between them? (199) **PTA 3M**
3. Acidic nature of nitro alkanes. (200)

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4. How will you prepare oil of mirbane? (201)
5. Ethyl nitrite to ethanol.(202)
6. How is Chloropicrin prepared (203) **M20 2 MARK**
7. Hofmann's bromide reaction (209)
8. Gabriel phthalimide synthesis (209) **J20 3MARK**
9. Hoffmann's ammonolysis (209)
10. Sabatier – Mailhe method (210)
11. Schotten – Baumann reaction (214)
12. Diazotisation (215)
13. Libermann's nitroso test. (215)
14. Carbylamine reaction (216)
15. Mustard oil reaction (216) **S20 5Mii**
16. Hofmann-Mustard oil reaction. (216)
(How will you prepare phenyl mustard oil?)
17. How does aniline react with $\text{Br}_2/\text{H}_2\text{O}$? (217)
18. Why aniline does not undergo Friedel Crafts reaction. (218) **J20 2M**
19. Identify A and B. (208) **M20 5Mii**



20. From the following reaction, identify A and B. (202) **A21 2M Compulsory**



21. How will you convert nitrobenzene into (203)
Aniline, Phenyl hydroxyl amine, Nitrosobenzene, Azo benzene, azoxybenzene, hydrozobenzene, m – nitro aniline (204), 1,3,5 - trinitrobenzene (204), 3-nitro benzene sulphonic acid, 3-chloro nitro benzene.
22. Name the reducing agent used in the reduction of nitrobenzene to the following compounds. (203) **S20 5Mi**

(A) Aniline

(B) Phenyl hydroxylamine

(C) Nitrosobenzene

23. How will you distinguish between primary secondary and tertiary aliphatic amines?

24. Arrange the following: (212BB234) **PTA2M**

(i) In decreasing order of the pK_b values: $\text{C}_2\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, CH_3NH_2 (ii) Increasing order of basic strength : $\text{C}_2\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, CH_3NH_2

25. How the following conversion are effected? **PTA5M**

(i) Nitro benzene \rightarrow N – phenyl hydroxyl amine (203)(ii) Propanamide \rightarrow Propan – 1 – amine (209)(iii) Aniline \rightarrow p – nitroaniline (218)

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26. An organic compound (A) on reduction gives compound (B). (B) on treatment with CHCl_3 and alcoholic KOH gives (C). (C) on catalytic reduction gives N – methyl aniline. Identify A, B, C and write its equation. (216 Carbylamine) **PTA3M**

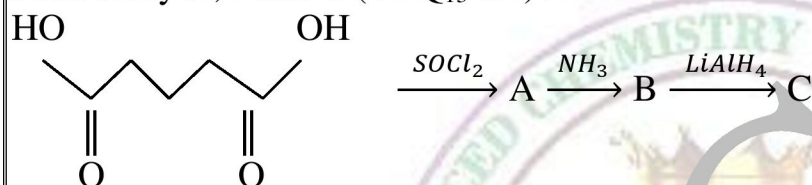
27. Account the following **PTA3M (BBQ₈234)**

- Aniline does not undergo Friedal – crafts reaction
- Ethylamine is soluble in water whereas aniline is not
- Amines are more basic than amides.

28. An organic compound (A) – $\text{C}_7\text{H}_7\text{NO}$ on treatment with Br_2 and KOH gives an amine (B), which gives carbylamines test. (B) upon diazotization to give (C). (C) on coupling with P. cresol to give compound (D). Identify A, B, C and D with necessary reaction. (209) **PTA5M**

29. An organic compound (A) – CNCl react with methyl magnesium Bromide to give compound B – ($\text{C}_2\text{H}_3\text{N}$). B-upon catalytic reduction to give compound C – ($\text{C}_2\text{H}_7\text{N}$). C gives carbylamine test. Identify compound A, B and C and write the reactions. (224, 225) **3MC**

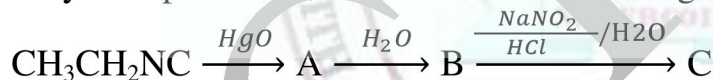
30. Identify A, B and C (BBQ₁₃235) **PTA5M i**



31. An aromatic nitro compound (A) on reduction with Sn/HCl gives compound (B) $\text{C}_6\text{H}_7\text{N}$, which on treatment with Benzoyl chloride in the presence of pyridine to give compound (C). Compound (B) on treatment with CH_3Br to give compound (D) which further reacts with NaNO_2/HCl to give compound (E) with yellow oil liquid. Identify (A) to (E) and write the reactions. **PTA 5M**

32. Write a note on Sabatier – mailhe method? (210) **PTA 2M**

33. Identify Compounds A, B and C in the following sequence of reaction. (BBQ_{5vii}233) **3MC**



34. Write the uses of nitroalkanes. (228) **PTA 5M ii**

35. Identify A to C in the following sequence? (BBQ_{5i}233) **GM 3MC**



36. write short notes on **GM 5M** a) Mustard oil reaction (216) b) Carbylamines reaction (216) c) Gabriel pthalamide synthesis. (209)

LESSON 14 Biomolecules

- Outline the classification of carbohydrates giving example for each (239)
- What are the different types of monosaccharides. (240)
- Elucidate the structure of glucose (241)
- Draw the cyclic structure of glucose (243) (Write the structure of α – D(+) Glucopyranose.) (243) **2M**
- Define anomer. Give example. (243)
- Define mutarotation. (244)
- Define epimers and epimerization. (244)
- Explain the structure of Fructose. (245) **GM5M**
- What happens when fructose is partially reduced with sodium amalgam and water? (245) **PTA 5M ii**
- Draw the cyclic structure of fructose. (246)

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11. Write about the structure of sucrose (247)
12. Explain the structure of lactose (247)
13. Explain the structure of maltose (248)
14. What is glycosidic linkage?(247) **M20 5Mi**
15. Mention the importance of Carbohydrates (250)
16. Define isoelectric point (252)
17. What is Zwitter ion? (252)
18. Write a short note on peptide bond (252)
19. Write a short note on peptide bond. (252) **5M i**
20. Write the Zwitter ion structure of alanine. (252) **2M**
21. Explain composition and structure of nucleic acids. (260)
22. Explain types of RNA molecules (264) **J20 5Mi**
23. Give any four differences between DNA and RNA. (264) **A21 3M GM2M**
2M- 2 marks; 2MC- 2 marks Compulsory; 3M- 3 marks; 5M- 5 marks;
GM2M- Govt model question paper 2 marks;

| NAME | REACTIONS | ORGANIC |
|--|--|---------|
| LESSON 11 | | |
| 1. Markonikoff's rule. (108) | 50. Clemmensen reduction(160) | |
| 2. Grignard reagent(108) | 51. Wolfkishner reduction(161) | |
| 3. Hydroboration(109) | 52. Aldol condensation(162) | |
| 4. Bayer's reagent. (110) | 53. Crossed aldol condensation(163) | |
| 5. Saponification(110) | 54. Claisen-schmidt condensation(163) | |
| 6. Lucas test (111) | 55. Cannizaro reaction(164) | |
| 7. Victor meyer's test(111) | 56. Crossed cannizaro reaction(164) | |
| 8. Saytzeff's rule.(116) | 57. Benzoin condensation(164) | |
| 9. Swern oxidation.(117) | 58. Penkins reaction(165) | |
| 10. Esterification(118) | 59. Knoevenagal reaction(165) | |
| 11. Biological oxidation(118) | 60. Schiffs base(165) | |
| 12. TNG(121) | 61. Malachite green dye(165) | |
| 13. Acrolein (121) | 62. Tollens reagent test(166) | |
| 14. Dows process(127) | 63. Fehlings solution test(166) | |
| 15. Schotten- baumann reaction(128) | 64. Benedicts solution test(167) | |
| 16. Williamson ether synthesis(128) | 65. Schiffs reagent test(167) | |
| 17. Kolbe's (or) Kolbe's schmit reaction(131) | 66. Esterification (173) | |
| 18. Riemer tiemann reaction(131) | 67. Kolbs electrolytic(175) | |
| 19. Phthalein reaction(132) | 68. decaroxylation(175) | |
| 20. Coupling reaction(132) | 69. Trans esterification(185) | |
| 21. Friedel craft's reaction(139) | 70. Claisen condensation(186) | |
| | 71. Hoffmanns degradation(188) | |
| LESSON 12 | LESSON-13 | |
| 43. Ozonolysis(149) | 1. chloropicrin (203) | |
| 44. Rosenmund reduction(151) | 2. Gabriel phthalimide sythesis(209) | |
| 45. Stephen's reaction(151) | 3. Hoffmanns ammonolysis(209) | |
| 46. Gattermann-koch reaction(152) | 4. Sabatier -Mailhe method(210) | |
| 47. Friedel crafts acylation (152) | 5. Schotten -baumann reaction(214,215) | |
| 48. Urotropine(158) | 6. Carbylamine reaction(216) | |
| 49. Popoff's rule (159) | 7. Mustard oil reaction(216) | |

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Dedication!**Determination!!****Distinction!!!****ACTC ADVANCED CHEMISTRY TUITION CENTRE, NAGERCOIL., KK DIST 9940847892****PLAN!****PREPARE!!****PRESENTATION!!!****ORGANIC PROBLEM**

- An organic compound (A) of molecular formula C_3H_8O gives turbidity within 5-10 minutes on reaction with anhydrous $ZnCl_2/HCl$. Compound (A) on treatment with PCC (Pyridinium chloro chromate) gives a carbonyl compound(B) which on further chlorination gives compound (C) of molecular formula $C_3H_3OCl_3$. Identify (A),(B) and (C) and explain the reactions. (117)
- An organic compound (A) C_2H_6O liberates hydrogen on treatment with metallic sodium. (A) on mild oxidation gives (B) C_2H_4O which answers iodoform test. (B) when treated with CH_3OH/HCl to give (C) ($C_4H_{11}O_2$). Identify (A), (B) and (C) and explain the reactions. (155)
- An organic compound A of molecular formula C_6H_6O gives a violet colourisation with neutral $FeCl_3$. Compound A on treatment with $NaOH$ gives compound B. Compound B on treatment with CO_2 at 400 K under pressure gives C. This product on acidification gives compound D($C_7H_6O_3$) which is used in medicine. Identify A,B,C and D and explain the reactions. (130 Kolbe reaction)
- An organic compound A of molecular formula C_3H_6O on reduction with $LiAlH_4$ gives B. Compound B gives blue colour in Victor Mayer's test and also forms a chloride C with $SOCl_2$. (A) reacts with NH_3 to form D($C_6H_{13}NO$). Identify A, B, C and D and explain the reactions.(158)
- An organic compound (A) C_3H_8O answers Lucas test-within 5-10 minutes and on oxidation forms B(C_3H_6O). This on further oxidation forms C($C_2H_4O_2$) which gives effervescence with Na_2CO_3 . B also undergoes iodoform reaction. Identify A, B, and C,. Explain the conversion of A to B and C.
- An organic compound (A) of molecular formula C_6H_6O gives violet colour with neutral $FeCl_3$. (A) react with $CHCl_3/aq.NaOH$ to gives B. (A) also reacts with $C_6H_5N_2Cl$ to give the compound (C) which is a red orange dye. Identify (A),(B) and (C). Explain with suitable reactions. (130)
- Compound (A) of molecular formula C_3H_8O liberates hydrogen with sodium metal. (A) with P/I_2 gives (B). Compound (B) on treatment with silver nitrite gives (C) which gives blue colour with nitrous acid. Identify (A),(B),(C) and explain the reactions. (112)
- Compound (A) with molecular formula C_6H_6O gives violet colour with neutral $FeCl_3$, reacts with $CHCl_3$ and $NaOH$ gives (B) with molecular formula $C_7H_6O_2$. Compound (A) reacts with Ammonia at 473 K in the presence of $ZnCl_2$ and gives compound (C) with molecular formula C_7H_7N . Compound (D) undergoes carbylamines test. Identify (A), (B), and (C). Explain the reactions. 127
- An organic compound C_2H_6O (A) reacts with H_2SO_4 at 443 K and gives (B) of molecular formula C_2H_4 . (B) Reacts with cold alkaline $KMnO_4$ (Baeyer's reagent) to give (C) of molecular formula $C_2H_6O_2$. Identify (A). (B), (C). Explain the reactions. (115 & 110)
- An organic compound A (C_2H_6O) liberates hydrogen with sodium metal. A when heated with alumina at 620 K gives an alkene B which when passed through Bayer's reagent gives C($C_2H_6O_2$). C reacts with PI_3 and gives back B. Identify A, B and C. Write the reactions. (110, 115, 119)
- A ether (A) $C_5H_{12}O$ when heated with excess of hot concentrated HI, produced two alkyl halides, which on hydrolysis forms compound (B) and (C). Oxidation Of (B) gives an acid (D) where as oxidation of (C) gives ketone (E). Identify A, B, C, D and E and write the chemical equation.
- An organic compound (A) on reduction gives compound (B). (B) on treatment with $CHCl_3$ and alcoholic KOH gives (C). (C) on catalytic reduction gives N – methyl aniline. Identify A,B,C.
- An organic compound C_3H_4 (A) on hydration with Hg^{2+} / H_2SO_4 gives compound (B) which gives positive iodoform test. Compound (B) heated with $NH_2 - NH_2 / C_2H_5ONa$ to give hydrocarbon (C). (B) also treated with $HCHO$ in the presence of dil $NaOH$ gives compound (D). Identify A, B, C and D. Write the chemical reactions involved.
- An organic compound (A) – $C_3H_8O_3$ used a sweetening agent, which on oxidation with Fenton's reagent gives a mixture of compounds B and C. Identify A, B and C. Write Possible reactions.
- An organic compound (A) – C_7H_7NO on treatment with Br_2 and KOH gives an amine (B), which gives carbylamines test. (B) upon diazotization to give (C). (C) on coupling with P. cresol to give compound (D). Identify A,B,C and D with necessary reaction.

Dedication!**Determination!!****Distinction!!!****ACTC ADVANCED CHEMISTRY TUITION CENTRE, NAGERCOIL., KK DIST 9940847892****PLAN!****PREPARE!!****PRESENTATION!!!**

16. An organic Compound (A)- C_2H_4O reduces Tollen's and fehling's solution. A-react with methanol and HCl to give compound (B) – $C_4H_{10}O_2$. A-on reaction with Methanal in the presence of dilute NaOH to give compound (C) – $C_3H_6O_2$. Identify Compounds A, B and C with necessary reactions.
17. An organic Compound C_3H_5Br (A) on treatment with Mg in dry ether gives (B) which on treatment with CO_2 followed by acidification gives (C). Identify (A), (B) & (C) and write possible equations.
18. An aromatic nitro compound (A) on reduction with Sn/HCl gives compound (B) C_6H_7N , which on treatment with Benzoyl chloride in the presence of pyridine to give compound (C). Compound (B) on treatment with CH_3Br to give compound (D) which further reacts with $NaNO_2/HCl$ to give compound (E) with yellow oil liquid. Identify (A) to (E) and write the reactions.
19. An organic compound C_2H_6O (A) heated with Con H_2SO_4 at 443K to give an unsaturated hydrocarbon C_2H_4 (B), which on treatment with Bayer's reagent to give compound $C_2H_6O_2$ (C) which is used as antifreeze in automobile radiator. Compound (C) distilled with con H_2SO_4 to give cyclic compound $C_4H_8O_2$ (D). Compound (A) is heated with Con H_2SO_4 at 413K to give compound $C_4H_{10}O$ (E). Identify Compounds (A) to (E) and write equations.
20. Compound A of molecular formula C_7H_6O reduces Tollen's reagent when A reacts with 50% NaOH gives compound B of molecular formula C_7H_8O and C of molecular formula $C_7H_5O_2Na$. compound C on treatment with dil HCl gives compound D of molecular formula $C_7H_6O_2$. When D is heated with sodalime gives compound E. identify A,B,C,D & E. (163) GM5M

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