CBCS-B.Sc-CHEMISTRY- I-Semester (C-I) – List of important Questions(To get >70 Marks)

I) INORGANIC CHEMISTRY

1). Chemical Bonding :-

1). Explain Polarizability and Fazan's rule with examples.
2). Explain sp^3 (NH_3), sp^3d (PCl_5), sp^3d^2 (SF_6) and sp^3d^3 (IF_7) hybridizations with examples.
3). Explain VSPER Theory with examples.
4). Explain the salient features of MOT and Linear combination of atomic orbitals (LCAO).
5). Write the differences between Bonding and Anti-Bonding Molecular Orbitals (BMOs and ABMOs).
6). Draw MOED of N_2 and O_2. Explain the Bond order, Stability and Magnetic properties.
7). Draw MOED of N**O** and CO. Explain the magnetic character and Bond order.

2). p-Block Elements-1 :-

8). Explain the structure of Diborane.
9). What is Inorganic Benzene ($B_3N_3H_6$)?. Write its structure, preparation and properties.
10). Write the structures of B_4H_{10} and B_5H_9.
11). Explain the Lewis-acid nature of Boron halides (BX_3)
12). Explain different types of Carbides and Nitrides.
13). What are Silicones?. Explain the different types of silicones.
14). Explain the preparation and properties of Hydrazine(NH_2-NH_2) and Hydroxyl amine(NH_2OH).
15). Explain the preparation and properties of Phosphazenes.

II). ORGANIC CHEMISTRY

3). Structural Theory in Organic Chemistry:-

16). What is Inductive effect?. Explain the basicity of different amines & Acidity of carboxylic acids.
17). What is Mesomeric effect?. Explain the acidity of Phenol.
18). What is Hyperconjugation?. Explain the stability order of free radicals using Hyperconjugation.
19). Explain the stability order of different types of Carbonium ions & Carbanions.

4). Acyclic Hydrocarbons:-

20). Explain the Chlorination of methane with mechanism (or)
Explain the free radical substitution with mechanism.
21). Explain Markonikoff`s rule with mechanism and examples (or)
Explain the addition of HX (HCl) with Alkenes.
22). Explain Anti-markonikoff`s rule with mechanism and examples. (or)
Explain the addition of HBr with Alkenes in presence of peroxide with mechanism.
23). Explain Zaitsev's rule (Sayrzef's rule) with examples.
24). Explain Diels-Alder reaction with examples.
25). Explain the 1,2 & 1,4-addition of HBr with 1,3-Butadiene with mechanism.
26). Explain the acidic character of Acetylene (1-Alkynes).
27). Explain the metal-ammonia reduction and catalytic hydrogenation of Alkynes.

5). Aromatic Hydrocarbons :-

28). What is Aromaticity?. Explain Huckel`s rule with examples.
29). Explain Friedel-Crafts Alkylation and Acylation with mechanism and examples.
30). Explain Nitration of benzene with mechanism.

31). What are ring activating (ortho & para-directing) groups?.
Explain the orientation of ring activating groups (Amino, Methoxy) in aromatic substitution.
32). What are ring deactivating (meta-directing) groups?.
Explain the orientation of ring deactivating groups (Nitro, Carbonyl) in aromatic substitution.

III). PHYSICAL CHEMISTRY

6). Atomic Structure & Elementary Quantum Mechanics :-

33). Explain Black-body radiation and Planck's radiation law.
34). Explain photoelectric effect.
35). Explain Compton Effect.
36). Derive and explain de-Broglie`s wave theorem.
37). Explain Heisenberg`s uncertainty principle.

7). Gaseous State:-

38). Derive Vander waal`s equation of state.
39). Explain critical phenomenon (or) Critical temp, critical pressure & critical volume (Tc, Pc & Vc).
40). Explain Joul-Thompson effect and liquification of gases by Linde`s process.
41). Derive reduced equation of state (or) Explain the Law of the corresponding states.
42). Explain why gases deviates from ideal behavior?.

8). Liquid State and Solutions:-

43). Write the structural differences between solids, liquids and gases.
44). Define surface tension and explain its determination by Stalagmometer.
45). Explain the determination of coefficient of viscosity by Ostwald viscometer.
46). Explain Raults law and Henry`s law.
47). Explain Partially miscible liquids.
48). Explain Azeotropic mixtures (or) Solutions with +ve & -ve deviations from Raults law.
49). Explain Fractional distillations.

IV). GENERAL CHEMISTRY

9). General Principles of Inorganic Qualitative Analysis :-

50). Explain Solubility product and Common ion effect with examples.
51). What is sodium carbonate extract?. Explain its importance in qualitative analysis.
52). What is the principle involved in separation of Group-II and Group-IV cations.
53). Write a note on Brown ring test and Nesslers reagent.

10). Isomerism:-

54). Explain Constitutional isomers (Chain, Positional & Functional isomers) with examples.
55). Write the differences between enantiomers and diastereomers.
56). Explain Bayer-strain theory (BST).
57). Explain the conformational analysis of n-Butane and 1,2-dichloroethane.
58). Explain E,Z-Nomenclature with examples.

11). Solid State Chemistry:-

59). Derive Bragg's equation.
60). Explain the determination of NaCl-crystal structure by Bragg's method.
61). Explain symmetry elements in crystals.
62). Explain the Law of rationality of indices (Weiss indices and Miller indices).

CBCS-B.Sc-CHEMISTRY- I-Semester (C-I) – List of Most Imp. Questions(To get >50 Marks)

I) INORGANIC CHEMISTRY

1). Chemical Bonding :-

1). Explain Fazan's rule with examples.
2). Explain sp^3d (PCl_5), sp^3d^2 (SF_6) and sp^3d^3 (IF_7) hybridizations with examples.
3). Explain the salient features of MOT and Linear combination of atomic orbitals (LCAO).
4). Draw MOED of N_2 and O_2. Explain the Bond order, Stability and Magnetic properties.
5). Draw MOED of N**O** and CO. Explain the magnetic character and Bond order.

2). p-Block Elements-1 :-

6). Explain the structure of Diborane.
7). What is Inorganic Benzene ($B_3N_3H_6$)?. Write its structure, preparation and properties.
8). Write the structures of B_4H_{10} and B_5H_9.
9). Explain different types of Carbides.
10). What are Silicones?. Explain the different types of silicones.
11). Explain the preparation and properties of Hydrazine(NH_2-NH_2) and Hydroxyl amine(NH_2OH).

II). ORGANIC CHEMISTRY

3). Structural Theory in Organic Chemistry:-

12). What is Inductive effect?. Explain the basicity of different amines & Acidity of carboxylic acids.
13). What is Mesomeric effect?. Explain the acidity of Phenol.
14). What is Hyperconjugation?. Explain the stability order of free radicals using Hyperconjugation.
15). Explain the stability order of different types of Carbonium ions & Carbanions.

4). Acyclic Hydrocarbons:-

16). Explain the Chlorination of methane with mechanism (or)
Explain the free radical substitution with mechanism.
17). Explain Markonikoff`s rule with mechanism and examples (or)
Explain the addition of HX (HCl) with Alkenes.
18). Explain Anti-markonikoff`s rule with mechanism and examples. (or)
Explain the addition of HBr with Alkenes in presence of peroxide with mechanism.
19). Explain Zaitsev's rule (Sayrzef's rule) with examples.
20). Explain Diels-Alder reaction with examples.
21). Explain the 1,2 & 1,4-addition of HBr with 1,3-Butadiene with mechanism.

5). Aromatic Hydrocarbons :-

22). What is Aromaticity?. Explain Huckel`s rule with examples.
23). Explain Friedel-Crafts Alkylation and Acylation with mechanism and examples.
24). Explain Nitration of benzene with mechanism.

III). PHYSICAL CHEMISTRY

6). Atomic Structure & Elementary Quantum Mechanics :-

25). Explain photoelectric effect.
26). Explain Compton Effect.
27). Derive and explain de-Broglie`s wave theorem.
28). Explain Heisenberg`s uncertainty principle.

7). Gaseous State:-

29). Derive Vander waal`s equation of state.
30). Explain critical phenomenon (or) Critical temp, critical pressure & critical volume (Tc, Pc & Vc).
31). Explain Joul-Thompson effect and liquification of gases by Linde`s process.
32). Derive reduced equation of state (or) Explain the Law of the corresponding states.

8). Liquid State and Solutions:-

33). Write the structural differences between solids, liquids and gases.
34). Define surface tension and explain its determination by Stalagmometer.
35). Explain the determination of coefficient of viscosity by Ostwald viscometer.
36). Explain Raults law and Henry`s law.
37). Explain Partially miscible liquids.

IV). GENERAL CHEMISTRY

9). General Principles of Inorganic Qualitative Analysis :-

38). Explain Solubility product and Common ion effect with examples.
39). Write a note on Brown ring test and Nesslers reagent.

10). Isomerism:-

40). Explain Constitutional isomers (Chain, Positional & Functional isomers) with examples.
41). Write the differences between enantiomers and diastereomers.
42). Explain Bayer-strain theory (BST).
43). Explain E,Z-Nomenclature with examples.

11). Solid State Chemistry:-

44). Derive Bragg's equation.
45). Explain the determination of NaCl-crystal structure by Bragg's method.
46). Explain the Law of rationality of indices (Weiss indices and Miller indices).

CBCS-B.Sc-CHEMISTRY- I-Semester (C-I) – List of V.V. Imp. Qs (To get Pass Marks)

I) INORGANIC CHEMISTRY

1). Chemical Bonding :-

1). Explain Fazan's rule with examples.

2). Explain the salient features of MOT and Linear combination of atomic orbitals (LCAO).

3). Draw MOED of N_2 and O_2. Explain the Bond order, Stability and Magnetic properties.

4). Draw MOED of N**O** and CO. Explain the Bond order and Magnetic character.

2). p-Block Elements-1 :-

5). Explain the structure of Diborane.

6). What is Inorganic Benzene ($B_3N_3H_6$)?. Write its structure, preparation and properties.

7). Explain different types of Carbides.

8). What are Silicones?. Explain the different types of silicones.

9). Explain the preparation and properties of Hydrazine(NH_2-NH_2) and Hydroxyl amine(NH_2OH).

II). ORGANIC CHEMISTRY

3). Structural Theory in Organic Chemistry:-

10). What is Inductive effect?. Explain the basicity of different amines & Acidity of carboxylic acids.

11). What is Mesomeric effect?. Explain the acidity of Phenol.

12). What is Hyperconjugation?. Explain the stability order of free radicals using Hyperconjugation.

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13). Explain the Chlorination of methane with mechanism (or)
Explain the free radical substitution with mechanism.

14). Explain Markonikoff`s rule with mechanism and examples (or)
Explain the addition of HX (HCl) with Alkenes.

15). Explain Anti-markonikoff`s rule with mechanism and examples. (or)
Explain the addition of HBr with Alkenes in presence of peroxide with mechanism.

16). Explain Diels-Alder reaction with examples.

5). Aromatic Hydrocarbons :-

17). What is Aromaticity?. Explain Huckel`s rule with examples.

18). Explain Friedel-Crafts Alkylation and Acylation with mechanism and examples.

III). PHYSICAL CHEMISTRY

6). Atomic Structure & Elementary Quantum Mechanics :-

19). Explain photoelectric effect.

20). Derive and explain de-Broglie`s wave theorem.

21). Explain Heisenberg`s uncertainty principle.

7). Gaseous State:-

22). Derive Vander waal`s equation of state.

23). Explain critical phenomenon (or) Critical temp, critical pressure & critical volume (Tc, Pc & Vc).

24). Explain Joul-Thompson effect and liquification of gases by Linde`s process.

8). Liquid State and Solutions:-

25). Define surface tension and explain its determination by Stalagmometer.

26). Explain the determination of coefficient of viscosity by Ostwald viscometer.

27). Explain Raults law and Henry`s law.

28). Explain Partially miscible liquids.

IV). GENERAL CHEMISTRY

9). General Principles of Inorganic Qualitative Analysis :-

29). Explain Solubility product and Common ion effect with examples.

30). Write a note on Brown ring test and Nesslers reagent.

10). Isomerism:-

31). Write the differences between enantiomers and diastereomers.

32). Explain Bayer-strain theory (BST).

33). Explain E,Z-Nomenclature with examples.

11). Solid State Chemistry:-

34). Derive Bragg's equation.

35). Explain the determination of NaCl-crystal structure by Bragg's method.

New CBCS-B.Sc-CHEMISTRY-II-Semester-2019-20 (C-II)–List of **Imp Questions (**To get **>70 Marks)**

I) INORGANIC CHEMISTRY

1). p-Block Elements-II :-

1). Explain the classification of Oxides based on the content of oxygen (Normal oxides, mixed oxides, sub oxides, and superoxides).
2). Explain the classification of Oxides based on chemical behavior (acidic, basic, neutral & amphoteric oxides).
3). Write the structures of Oxides of Nitrogen, Sulphur and Chlorine.
4). Write any two redox reactions of HNO_2, H_3PO_3, H_2SO_3, H_2SO_4.
5). What are interhalogen compounds?. Explain the structures of AX_3 (ClF_3,BrF_3), AX_5 (BrF_5, IF_5) and AX_7 (IF_7).
6). What are poly halides?. Explain the structure of ICl_2^-, ICl_4^- and I_3^-.
7). What are "Pseusohalogens"?. Explain the preparation and properties comparison with halogens.

2). Chemistry of Zero Group Elements :-

8). Write the structures, shape & hybridization of XeF_2, XeF_4, XeF_6, XeO_3 & XeO_4.
9). What are Clatherate compounds?. Explain the anomalous behavior of He.

3). Chemistry of d-Block Elements:-

10). What are d-Block elements?. Explain a). Variable oxidation states b). Magnetic property of d-Block elements.
11). Explain a). Complex formation property b). Catalytic property of d-Block elements.
12). Explain Latimer and Frost diagrams with an example.

II). ORGANIC CHEMISTRY

4). Halogen Compounds :-

13). Explain SN^1 reaction with mechanism and stereochemistry by taking 1-Bromo-1-phenyl propane.
14). Explain SN^2 reaction with mechanism and stereochemistry by taking 2-Bromo butane.
15). Explain why i). Vinyl halides are less reactive & allyl halides are more reactive in hydrolysis reaction.
ii). Aryl halides are less reactive & benzyl halides are more reactive in hydrolysis reaction.

5). Hydroxycompounds and Ethers:-

16). Explain the synthesis of alcohols from Grignard reagents and carbonyl compounds.
17). Explain Reimer-Tiemann reaxn with mechanism
18). Explain Kolbe reaxn with mechanism
19). Explain Gatterman-Koch reaction with mechanism
20). Explain Houben-Hoesch condensation with mechanism
21). Explain Williamsons synthesis with examples.

6). Carbonyl Compounds :-

22). Explain Cannizaro reaxn with mechanism.
23). Explain Clemenson's reduction & Wolf-Kishner reduction with examples.
24). Write the preparation of aldehydes and ketones from acid chlorides and 1,3-dithianes with examples.
25). Write the reaxns of carbolnyl compounds with HCN, RMgX and NH_2OH.

III). PHYSICAL CHEMISTRY

7). Electrochemistry and EMF :-

26). Define specific conductance (Κ), equivalent conductance (λ) and molar conductance (μ). Explain the effect of dilution on conductance (Κ, λ & μ).
27). State, explain and give applications of "Kohlrausch law".
28). Problems on Kohlrausch law.
29). Define transport number and its determination by Hittorf method.
30). Explain the construction and working of Calomel electrode.
31). Write and explain Debye-Huckel-Onsager equation.
32). Explain Ostwald`s dilution law.
33). Explain Arrhenius theory of electrolyte dissociation and its limitations.
34). Write about Nernst equation, cell EMF and single electrode potential, electrochemical series.
35). Determination of pH using hydrogen electrode.
36). Explain conductometric and potentiometric titrations.
37). Explain the types of reversible electrodes (Gas electrode, metal-metal ion and metal-insoluble salt electrodes)
38). Explain the determination of Ka of acid and solubility product (Ksp) of a sparingly soluble salt, using conductivity measurements.

IV). GENERAL CHEMISTRY

8).Theory of Quantitative Analysis:-

39). Explain Co-precipitation and Post-precipitation.
40). Explain the Ostwalds theory of Acid-Base indicators in neutralization titrations.
41). Define Indicator and explain the selection of Indicators for different acid-base titrations.
42). Explain the theory of redox titrations with examples of internal and external indicators.

9). Stereoisomerism:-

43). Explain Plane of symmetry (σ), Center of symmetry (i), Axis of symmetry (Cn) and Alternate axis of symmetry(Sn) with examples.
44). Explain Asymmetric and Dissymmetric molecules with examples.
45). Explain D,L-configuration with examples.
46). Explain R,S-configuration using Cohn-Ingold-Prelog rules with examples.

10).Dilute Solutions and Collegative Properties:-

47). State and explain Raoults law and derive the relation between the molecular weight & relative lowering of vapour pressure.
48). Define elevation in boiling point (ΔT_b) and derive the relation between the molecular weight of solute & elevation in boiling point (ΔT_b).
49). Define depression in freezing point (ΔT_f) and derive the relation between the molecular weight of solute & depression in freezing point (ΔT_f).
50). Define osmotic pressure (π), the laws of osmotic pressure and derive the relation between the molecular weight of solute & osmotic pressure (π).

New CBCS-B.Sc-CHEMISTRY-II-Semester-2019-20 (C-II)–List of **Imp Questions (**To get **>50 Marks)**

I) INORGANIC CHEMISTRY

1). p-Block Elements-II :-

1). Explain the classification of Oxides based on the content of oxygen (Normal, mixed, sub and super oxides).
2). Explain the classification of Oxides based on chemical behavior (acidic, basic, neutral & amphoteric oxides).
3). Write any two redox reactions of HNO_2, H_3PO_3, H_2SO_3, H_2SO_4.
4). What are interhalogen compounds?. Explain the structures of AX_3 (ClF_3, BrF_3), AX_5 (BrF_5, IF_5) and AX_7 (IF_7).
5). What are poly halides?. Explain the structure of ICl_2^-, ICl_4^- and I_3^-.
6). What are "Pseusohalogens"?. Explain the preparation and properties comparison with halogens.

2). Chemistry of Zero Group Elements :-

7). Write the structures, shape & hybridization of XeF_2, XeF_4, XeF_6, XeO_3 & XeO_4.

3). Chemistry of d-Block Elements:-

8). What are d-Block elements?. Explain a). Variable oxidation states b). Magnetic property of d-Block elements.
9). Explain a). Complex formation property b). Catalytic property of d-Block elements.

II). ORGANIC CHEMISTRY

4). Halogen Compounds :-

10). Explain SN^1 reaction with mechanism and stereochemistry by taking 1-Bromo-1-phenyl propane.
11). Explain SN^2 reaction with mechanism and stereochemistry by taking 2-Bromo butane.

5). Hydroxycompounds and Ethers:-

12). Explain the synthesis of alcohols from Grignard reagents and carbonyl compounds.
13). Explain Reimer-Tiemann reaxn with mechanism
14). Explain Gatterman-Koch reaction with mechanism
15). Explain Houben-Hoesch condensation with mechanism
16). Explain Williamsons synthesis with examples.

6). Carbonyl Compounds :-

17). Explain Cannizaro reaxn with mechanism.
18). Explain Clemenson's reduction & Wolf-Kishner reduction with examples.
19). Write the preparation of aldehydes and ketones from acid chlorides and 1,3-dithianes with examples.

III). PHYSICAL CHEMISTRY

7). Electrochemistry and EMF :-

20). Define K, λ and μ. Explain the effect of dilution on conductance (K, λ & μ).
21). State, explain and give applications of "Kohlrausch law". 22). Problems on Kohlrausch law.
23). Define transport number and its determination by Hittorf method.
24). Explain the construction and working of Calomel electrode.
25). Write and explain Debye-Huckel-Onsager equation. 26). Explain Ostwald`s dilution law.
27). Explain Arrhenius theory of electrolyte dissociation and its limitations.
28). Write about Nernst equation, cell EMF and single electrode potential, electrochemical series.
29). Determination of pH using hydrogen electrode. 30). Explain conductometric and potentiometric titrations.

IV). GENERAL CHEMISTRY

8).Theory of Quantitative Analysis:-

31). Explain Co-precipitation and Post-precipitation.
32). Explain the Ostwalds theory of Acid-Base indicators in neutralization titrations.
33). Define Indicator and explain the selection of Indicators for different acid-base titrations.

9). Stereoisomerism:-

34). Explain Plane of symmetry (σ), Center of symmetry (i), Axis of symmetry (Cn) and Alternate axis of symmetry(Sn) with examples.
35). Explain Asymmetric and Dissymmetric molecules with examples.
36). Explain R,S-configuration using Cohn-Ingold-Prelog rules with examples.

10).Dilute Solutions and Collegative Properties:-

37). State and explain Raoults law and derive the relation between mw & relative lowering of vapour pressure.
38). Define elevation in boiling point (ΔT_b) and derive the relation between mw of solute & ΔT_b.
39). Define depression in freezing point (ΔT_f) and derive the relation between mw of solute & ΔT_f.
40). Define osmotic pressure (π), the laws of osmotic pressure and derive the relation between mw of solute & π

New CBCS-B.Sc-CHEMISTRY-II-Semester-2019-20 (C-II)–List of **Imp Questions (**To get **Pass Marks)**

I) INORGANIC CHEMISTRY

1). p-Block Elements-II :-

1). Explain the classification of Oxides based on the content of oxygen (Normal, mixed, sub and super oxides).
2). Explain the classification of Oxides based on chemical behavior (acidic, basic, neutral & amphoteric oxides).
3). Write any two redox reactions of HNO_2, H_3PO_3, H_2SO_3, H_2SO_4.
4). What are interhalogen compounds?. Explain the structures of AX_3 (ClF_3, BrF_3), AX_5 (BrF_5, IF_5) and AX_7 (IF_7).

2). Chemistry of Zero Group Elements :-

5). Write the structures, shape & hybridization of XeF_2, XeF_4, XeF_6, XeO_3 & XeO_4.

3). Chemistry of d-Block Elements:-

6). What are d-Block elements?. Explain a). Variable oxidation states b). Magnetic property of d-Block elements.
7). Explain a). Complex formation property b). Catalytic property of d-Block elements.

II). ORGANIC CHEMISTRY

4). Halogen Compounds :-

8). Explain SN^1 & SN^2 reactions with mechanism and with an example each.

5). Hydroxycompounds and Ethers:-

9). Explain the synthesis of alcohols from Grignard reagents and carbonyl compounds.
10). Explain Reimer-Tiemann reaxn with mechanism
11). Explain Gatterman-Koch reaction with mechanism
12). Explain Williamsons synthesis with examples.

6). Carbonyl Compounds :-

13). Explain Cannizaro reaxn with mechanism.
14). Explain Clemenson's reduction & Wolf-Kishner reduction with examples.

III). PHYSICAL CHEMISTRY

7). Electrochemistry and EMF :-

15). Define K, λ and μ. Explain the effect of dilution on conductance (K, λ & μ).
16). State, explain and give applications of "Kohlrausch law".
17). Define transport number and its determination by Hittorf method.
18). Explain the construction and working of Calomel electrode.
19). Write and explain Debye-Huckel-Onsager equation.
20). Explain Ostwald`s dilution law.
21). Write about Nernst equation, cell EMF and electrochemical series.

IV). GENERAL CHEMISTRY

8).Theory of Quantitative Analysis:-

22). Explain Co-precipitation and Post-precipitation.
23). Explain the Ostwalds theory of Acid-Base indicators in neutralization titrations.

9). Stereoisomerism:-

24). Explain Plane of symmetry (σ), Center of symmetry (i), Axis of symmetry (Cn) and Alternate axis of symmetry (Sn) with examples.
25). Explain R,S-configuration using Cohn-Ingold-Prelog rules with examples.

10).Dilute Solutions and Collegative Properties:-

26). State and explain Raoults law and derive the relation between mw & relative lowering of vapour pressure.
27). Define elevation in boiling point (ΔT_b) and derive the relation between mw of solute & ΔT_b.
28). Define osmotic pressure (π), the laws of osmotic pressure and derive the relation between mw of solute & π

New-CBCS-B.Sc-CHEMISTRY- III-Semester (P-III) – List of **Imp Questions (**To get **>70 Marks)**

I) INORGANIC CHEMISTRY

1). Cheistry of f-Block Elements :-

1). What is Lanthanide contraction?. What are its consequences?.
2). Explain the separation of Lanthanides by ion-exchange method and solvent extraction methods.
3). Explain the magnetic and color properties of Lanthanides.
4). Write the comparison between Lanthanides and Actinides

2). Co-ordination Compounds-I:-

5). Explain Werner's theory with examples.
6). Explain the Sidgwick's concept of EAN with examples.
7). Explain the Valance Bond Theory (VBT) with examples.
8). Explain the Geometrical isomerism in Square planar and Octahedral complexes with examples.
9). Explain the Optical isomerism in complex compounds.
10). Explain magnetic property of $[Co(NH_3)_6]^{+3}$, $[CoF_6]^{-3}$, $[Ni(CN)_4]^{-2}$, $[NiCl_4]^{-2}$, $[Ni(CO)_4]^0$ using VBT.
11). Define and give examples of Ionisation, Linkage and Coordination isomerism's of Coordination compounds.
12). Write the IUPAC-Names of $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{-3}$, $[FeF_6]^{4-}$, $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$, $[Ni(NH_3)_4]^{2+}$, $[NiCl_4]^{2-}$, $[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}$, $[Cu(NH_3)_4]^{2+}$, $[PtCl_4]^{2-}$ etc

3). Metal Carbonyls and Organometallic Chemistry:-

13). State and explain 18-Valance electron rule with suitable examples.
14). Explain the preparation, properties and structure of $Ni(CO)_4$
15). Write the structures i). $Fe(CO)_5$ ii). $Cr(CO)_6$ iii). $Fe_2(CO)_9$ iv). $Fe_3(CO)_{12}$
16). Define and explain the classification of Organo Metallic Compounds (OMC).
17). Explain the preparation and synthetic applications of Grignard reagents (R-MgX).
18). Explain the preparation and synthetic applications of Alkyl Lithium and Aluminium compounds.

II). ORGANIC CHEMISTRY

4). Carboxylic Acids and Derivatives:-

19). Explain Huns Diecker reaction and Schmidt reactions with mechanism.
20). Explain Hell-Volhard-Zelensky (HVZ) reaction and Arndt-Eistert synthesis with examples.
21). Explain Acid-catalysed Esterification with mechanism.
22). Explain Base-catalysed and Acid-catalysed Ester hydrolysis with mechanism.

5). Nitrohydrocarbons:-

23). Explain the halogenation and reaction of Nitro alkanes with HNO_2.
24). Explain Nef reaction with examples.
25). Explain the preparation of Nitrobenzene by nitration of Benzene.
26). Write the reduction of Nitro benzene in different media.

6). Amines, Cyanides and Isocyanides :-

27). Explain any two methods for the preparation of amines (or)
Explain Gabriel synthesis and Hoffman's bromamide reaction with mechanism & examples.
28). Wrote a short note on the use of 4^0-ammonium salts as Phase Transfer Catalysts (PTC).
29). Explain Hinsberg's separation of 1^0, 2^0 &3^0-amines from their mixture.
30). Write a short note on Carbyl amine reaction and Diazotisation reaction.
31). Explain the preparation of benzene diazonium chloride from Aniline with mechanism.
32). Explain Sandmeyer reaction, Gatterman reaction and Schiemann's reaction.
33). Explain the bromination and nitration of Aniline in different conditions.
34). Write any two preparation methods and properties of Cyanides and Isocyanides.

III). PHYSICAL CHEMISTRY

7). Thermodynamics-I :-

35). Explain extensive and intensive properties, state function and path functions with examples.
36). State and explain I-law of thermodynamics & II-law of thermodynamics.
37). Derive an expression for the max work done in an isothermal reversible expansion of an ideal gas
(or) Derive $W_{max} = 2.303n.R.T.\log(V_2/V_1)$.
38). Derive Cp-Cv = R
39). Derive Kirchoff`s equation.
40). Explain Joul-Thompson experiment and Joul-Thompson co-efficient.
41). Prove that PV^{γ}=Constant.
42). Explain Isothermal & Adiabatic processes, Reversible and irreversible processes.
43). Expalain Carnot cycle and derive the expression of efficiency of Heat engine.
44). Problems on the formula $W_{max} = 2.303n.R.T.\log(V_2/V_1)$.

8). Thermodynamics-II:-

45). Define entropy. Explain the Entropy change in spontaneous and non-spontaneous processes.
46). Entropy change in reversible isothermal and adiabatic process.
47). Derive Gibbs-Helmholtz equation ($\Delta G=\Delta H-T\Delta S$).
48). Write and explain Maxwell relations.
49). Derive the equation for the variation of G with P,V and T.

IV). GENERAL CHEMISTRY

9). Evaluation of Analytical Data :-

50). Explain Accuracy and Precession.
51). What is an Error ?. Explain types of errors (determinate, indeterminate, Absolute & Relative errors).
52). Explain Mean, Median, Range and Standard deviation with an example.

10). Carbanions-I :-

53). Explain the stability of different types of Carbanions.
54). Explain Aldol reaction, Perkin reaction and Benzoin condensation reactions with mechanism and examples.
55). Explain the conversion of lower alkynes to higher alkynes (OR)
Explain the conversion of Acetylene into Propyne, 1-Butyne and 2-Butyne.

11). Phase Rule :-

56). State the Gibb's Phase Rule and explain the terms 'Phase', 'Components' and 'Degrees of freedom'.
57). Draw and explain the Water system Phase diagram.
58). Draw and explain the Silver-Lead (Ag-Pb) system Phase diagram.
59). Draw and explain Mg-Zn system Phase diagram.
60). Draw and explain NaCl-H_2O system Phase diagram.

New-CBCS-B.Sc-CHEMISTRY- III-Semester (P-III) - Most Imp Questions (To get >50 Marks)

I) INORGANIC CHEMISTRY

1). Cheistry of f-Block Elements :-

1). What is Lanthanide contraction?. What are its consequences?.

2). Explain the separation of Lanthanides by ion-exchange method and solvent extraction methods.

3). Explain the magnetic and color properties of Lanthanides.

2). Co-ordination Compounds-I:-

4). Explain the Sidgwick's concept of EAN with examples.

5). Explain the Valance Bond Theory (VBT) with examples.

6). Explain the Geometrical isomerism in Square planar and Octahedral complexes with examples.

7). Explain the Optical isomerism in complex compounds.

8). Define and give examples of Ionisation, Linkage and Coordination isomerism's of Coordination compounds.

3). Metal Carbonyls and Organometallic Chemistry:-

9). State and explain 18-Valance electron rule with suitable examples.

10). Explain the preparation, properties and structure of $Ni(CO)_4$

11). Write the structures i). $Fe(CO)_5$ ii). $Cr(CO)_6$ iii). $Fe_2(CO)_9$ iv). $Fe_3(CO)_{12}$

12). Define and explain the classification of Organo Metallic Compounds (OMC).

13). Explain the preparation and synthetic applications of Grignard reagents (R-MgX).

II). ORGANIC CHEMISTRY

4). Carboxylic Acids and Derivatives:-

14). Explain Huns Diecker reaction and Schmidt reactions with mechanism.

15). Explain Hell-Volhard-Zelensky (HVZ) reaction and Arndt-Eistert synthesis with examples.

16). Explain Acid-catalysed Esterification with mechanism.

17). Explain Base-catalysed and Acid-catalysed Ester hydrolysis with mechanism.

5). Nitrohydrocarbons:-

18). Explain Nef reaction with examples.

19). Explain the preparation of Nitrobenzene by nitration of Benzene.

20). Write the reduction of Nitro benzene in different media.

6). Amines, Cyanides and Isocyanides :-

21). Explain any two methods for the preparation of amines (or)
Explain Gabriel synthesis and Hoffman's bromamide reaction with mechanism & examples.

22). Wrote a short note on the use of 4^0-ammonium salts as Phase Transfer Catalysts (PTC).

23). Explain Hinsberg's separation of 1^0, 2^0 &3^0-amines from their mixture.

24). Write a short note on Carbyl amine reaction and Diazotisation reaction.

25). Explain Sandmeyer reaction, Gatterman reaction and Schiemann's reaction.

26). Write any two preparation methods and properties of Cyanides and Isocyanides.

III). PHYSICAL CHEMISTRY

7). Thermodynamics-I :-

27). Explain extensive and intensive properties, state function and path functions with examples.

28). State and explain I-law of thermodynamics & II-law of thermodynamics.

29). Derive an expression for the max work done in an isothermal reversible expansion of an ideal gas

(or) Derive $W_{max} = 2.303n.R.T.\log(V_2/V_1)$.

30). Derive Cp-Cv = R

31). Derive Kirchoff`s equation.

32). Explain Joul-Thompson experiment and Joul-Thompson co-efficient.

33). Expalain Carnot cycle and derive the expression of efficiency of Heat engine.

8). Thermodynamics-II:-

34). Define entropy. Explain the Entropy change in spontaneous and non-spontaneous processes.

35). Entropy change in reversible isothermal and adiabatic process.

36). Derive Gibbs-Helmholtz equation ($\Delta G=\Delta H-T\Delta S$).

37). Write and explain Maxwell relations.

IV). GENERAL CHEMISTRY

9). Evaluation of Analytical Data :-

38). Explain Accuracy and Precession.

39). What is an Error ?. Explain types of errors (determinate, indeterminate, Absolute & Relative errors).

10). Carbanions-I :-

40). Explain Aldol reaction, and Benzoin condensation reactions with mechanism and examples.

41). Explain the conversion of lower alkynes to higher alkynes (OR)

Explain the conversion of Acetylene into Propyne, 1-Butyne and 2-Butyne.

11). Phase Rule :-

42). State the Gibb's Phase Rule and explain the terms 'Phase', 'Components' and 'Degrees of freedom'.

43). Draw and explain the Water system Phase diagram.

44). Draw and explain the Silver-Lead (Ag-Pb) system Phase diagram.

45). Draw and explain NaCl-H_2O system Phase diagram.

New-CBCS-B.Sc-CHEMISTRY- III-Semester (P-III) – V V Imp Questions (To get Pass Marks)

I) INORGANIC CHEMISTRY

1). Cheistry of f-Block Elements :-

1). What is Lanthanide contraction?. What are its consequences?.

2). Explain the separation of Lanthanides by ion-exchange method and solvent extraction methods.

3). Explain the magnetic and color properties of Lanthanides.

2). Co-ordination Compounds-I:-

4). Explain the Sidgwick's concept of EAN with examples.

5). Explain the Valance Bond Theory (VBT) with examples.

6). Explain the Geometrical isomerism and Optical isomerism in complex compounds.

7). Define and give examples of Ionisation, Linkage and Coordination isomerism's of Coordination compounds.

3). Metal Carbonyls and Organometallic Chemistry:-

8). State and explain 18-Valance electron rule with suitable examples.

9). Explain the preparation, properties and structure of $Ni(CO)_4$

10). Explain the preparation and synthetic applications of Grignard reagents (R-MgX).

II). ORGANIC CHEMISTRY

4). Carboxylic Acids and Derivatives:-

11). Explain Huns Diecker reaction and Schmidt reactions with mechanism.

12). Explain Hell-Volhard-Zelensky (HVZ) reaction and Arndt-Eistert synthesis with examples.

13). Explain Acid-catalysed Esterification with mechanism.

14). Explain Base-catalysed and Acid-catalysed Ester hydrolysis with mechanism.

5). Nitrohydrocarbons:-

15). Explain Nef reaction with examples.

16). Write the reduction of Nitro benzene in different media.

6). Amines, Cyanides and Isocyanides :-

17). Explain any two methods for the preparation of amines (or)

Explain Gabriel synthesis and Hoffman's bromamide reaction with mechanism & examples.

18). Explain Hinsberg's separation of 1^0, 2^0 &3^0-amines from their mixture.

19). Write a short note on Carbyl amine reaction and Diazotisation reaction.

20). Explain Sandmeyer reaction, Gatterman reaction and Schiemann's reaction.

III). PHYSICAL CHEMISTRY

7). Thermodynamics-I :-

21). State and explain I-law of thermodynamics & II-law of thermodynamics.

22). Derive an expression for the max work done in an isothermal reversible expansion of an ideal gas

(or) Derive $W_{max} = 2.303n.R.T.\log(V_2/V_1)$.

23). Derive Cp-Cv = R

24). Derive Kirchoff`s equation.

25). Explain Joul-Thompson experiment and Joul-Thompson co-efficient.

26). Expalain Carnot cycle and derive the expression of efficiency of Heat engine.

8). Thermodynamics-II:-

27). Entropy change in reversible isothermal and adiabatic process.

28). Derive Gibbs-Helmholtz equation ($\Delta G=\Delta H-T\Delta S$).

IV). GENERAL CHEMISTRY

9). Evaluation of Analytical Data :-

29). Explain Accuracy and Precession.

30). What is an Error ?. Explain types of errors (determinate, indeterminate, Absolute & Relative errors).

10). Carbanions-I :-

31). Explain Aldol reaction and Benzoin condensation reactions with mechanism and examples.

11). Phase Rule :-

32). State the Gibb's Phase Rule and explain the terms 'Phase', 'Components' and 'Degrees of freedom'.

33). Draw and explain the Water system Phase diagram.

34). Draw and explain the Silver-Lead (Ag-Pb) system Phase diagram.

2021-NEW-CBCS-B.Sc-CHEMISTRY- IV-Semester (P-IV)–List of **Imp Questions (**To get **>70 Marks)**

Dr. Pulabala Ramesh, Asst. Professor of Chemistry, SR&BGNR. Govt. College (Autonomous), Khammam.

I) INORGANIC CHEMISTRY

1). Co-ordination Compounds-II :-

1). Explain the important postulates of Crystal Field Theory (CFT).
2). Explain the crystal field (d-orbital) splitting in Octahedral and Tetrahedral complexes.
3). Explain the classification of metal complexes into para, dia, ferro and anti-ferro magnetic complexes.
4). Explain the Gouy`s method for the determination of magnetic susceptibility of complexes.
5). Explain the colour of transition metal aqua complex $[Ti(H_2O)_6]^{+3}$ (or) Explain d-d transitions with an ex.
6). Explain any two methods for the detection of complex formation
7). Explain Pearson`s HSAB Rule examples (Or) Explain Pearson`s classification of Hard and Soft Acids and Bases.
8). Explain the applications of HSAB-Rule in explaining the stability of complex and feasibility of a reaction.
9). Explain Thermodynamic stability and Kinetic stability of complexes.
10). Explain stepwise and overall stability constants.
11). Explain the Job`s method for the determination of composition of complexes.
12). Write the applications of complexes in medicine, polymerization (Zeigler-Natta), water softening and in analytical chemistry.

2). Bioirganic Chemistry:-

13). Explain the importance of Sodium and Potassium ions in biological systems.
14). Write the structure and functions of Haemoglobin.
15). Write the structure and functions of Chlorophyll.
16). Explain the light and dark reactions in photosynthesis.
17). Write a note on the biological importance of Cobalt (Co), Copper (Cu) and Zinc (Zn) metals.
18). Explain the toxicity of Arsenic (As), Mercury (Hg) and Lead (Pb).
19). Explain the Electron transport in light reactions from water to NADP+ (Z-scheme).

II). ORGANIC CHEMISTRY

4). Carbohydrates:-

20). Define and give examples for i). Mutarotation ii). Anomers iii). Epimers
21). Explain the formation of Osazone with mechanism.
22). Explain open chain structure of Glucose (or) explain the properties of Glucose.
23). Explain why Glucose, Fructose and Mannose forms the same Osazone ?.
24). Write the Fischer projections and Haworth structures of α-D-Glucose and β-D-Glucose.
25). Explain the conversion of D-Glucose (Aldohexose) into D-Arabinose (Aldopentose) (or) Explain Ruff`s degradation with an example.
26). Explain the conversion of D-Arabinose(Aldopentose) into D-Glucose (Aldohexose) (or) Explain Killiani-Fischer synthesis with an example.
27). Explain the conversion of D-Glucose into D-Mannose (or) Explain Epimerisation with an example.
28). Explain the conversion of D-Glucose (Aldohexose) into D-Fructose (Ketohexose).
29). Explain Lobry-de Bruyn-van Ekenstein rearrangement with mechanism.

5). Amino Acids and Proteins:-

30). Explain the Iso-electric point (IEP) and Zwitter ion with examples.
31). Explain any 2-preparation methods for Amino acids e.g. Strecker synthesis & Malonic ester synthesis.
32). Explain the structure of Peptides and the synthesis of a dipeptide.

5). Heterocyclic Comopounds:-

33).Explain why Furan participates in Diels-Alder reaction with an example.
34). Explain Paul-Knorr synthesis with examples.
35). Explain the aromaticity and Reactivity order of Furan, Pyrrole & Thiophene.
36). Explain the acidic nature of Pyrrole.
37). Compare the Basicity and Aromaticity of Pyridine and Pyrrole.
38). Explain Hantsch Pyridine synthesis and Chichibabin reaction of Pyridine.

III). PHYSICAL CHEMISTRY

6). Chemical Kinetics :-

39). Define Rate, order and molecularity of a reaction.
40). Explain the factors influencing the rate of reaction like conc, T, P, medium and catalyst.
41). Derive the rate equation for 1`st order reactions.
42). Derive the rate equation for 2`nd order reactions.
43). Problems based on 1'st and 2'nd order reactions and Half-life periods.

8). Photochemistry:-

44). Explain the laws of photochemistry (OR)
Explain Grothus-Drapers law and Stark-Einstein's law of photochemical equivalence.
45). Define Quantum yield and explain the reasons for High and Low quantum yields in some reactions.
46). Explain Jablonski diagram.
47). Define and give differences between Fluorescence and Phosphorescence.
48). **Problems** based on Stark-Einsteins law and Quantum efficiancy.

IV). GENERAL CHEMISTRY

11). Theory of Bonding in Metals:-

49). Explain Valance Bond Theory(VBT) of Metals.
50). Explain Free electron theory of Metals.
51). Explain the Band theory of Conductors, Semiconductors & Insulators.
52). What are Semiconductors?. Explain intrinsic, extrinsic, p-type & n-type semiconductors.

5). Carbanions-II:-

53). Explain Mannich reaction and Michael addition with mechanism and examples.
54). Explain Knoevenagal condensation reaction with mechanism and examples.
55). Explain Claissen condensation with mechanism (or) How Ethyl Aceto Acetate is prepared from ethyl acetate?.
56). Explain Acid hydrolysis and Ketonic hydrolysis of Ethyl Aceto Acetate (EAA).
57). How can you prepare Butanone, 3-Methyl butanone, Propanoic acid, Butyric acid, Succinic acid from EAA?.
58). How can you prepare Propanoic acid, Butyric acid and Succinic acid from Malonic ester?.

8). Surface chemistry (Adsorption & Colloids) :-

59). Write the differences between Lyophilic and Lyophobic colloids.
60). Explain Kinetic and Optical property (Brownian movement and Tyndal effect) of colloids.
61). What is Coagulation?. Explain Hardy-Schulze`s law and Gold number.
62). Explain Emulsions and Gels.
63). Write the differences between physical adsorption and chemical adsorption (Or)
Explain the factors influencing the adsorption.
64). Explain Freundlisch adsorption isotherm.
65). Explain and derive Langmuir adsorption isotherm.

2021-NEW-CBCS-B.Sc-CHEMISTRY- IV-Semester (P-IV)–List of **Most Imp Qs (**To get **>50 Marks)**

Dr. Pulabal Ramesh, Asst. Professor of Chemistry, SR&BGNR. Govt. College (Autonomous), Khammam.

I) INORGANIC CHEMISTRY

1). Co-ordination Compounds-II :-

1). Explain the important postulates of Crystal Field Theory (CFT).
2). Explain the crystal field (d-orbital) splitting in Octahedral and Tetrahedral complexes.
3). Explain the colour of transition metal aqua complex $[Ti(H_2O)_6]^{+3}$ (or) Explain d-d transitions with an ex.
4). Explain any two methods for the detection of complex formation
5). Explain Pearson`s HSAB Rule examples (Or) Explain Pearson`s classification of Hard and Soft Acids and Bases.
6). Explain Thermodynamic stability and Kinetic stability of complexes.
7). Explain stepwise and overall stability constants.
8). Explain the Job`s method for the determination of composition of complexes.
9). Write the applications of complexes in medicine, polymerization (Zeigler-Natta), water softening and in analytical chemistry.

2). Bioirganic Chemistry:-

10). Explain the importance of Sodium and Potassium ions in biological systems.
11). Write the structure and functions of Haemoglobin.
12). Write the structure and functions of Chlorophyll.
13). Explain the toxicity of Arsenic (As), Mercury (Hg) and Lead (Pb).
14). Explain the Electron transport in light reactions from water to NADP+ (Z-scheme).

II). ORGANIC CHEMISTRY

4). Carbohydrates:-

15). Define and give examples for i). Mutarotation ii). Anomers iii). Epimers
16). Explain the formation of Osazone with mechanism.
17). Explain open chain structure of Glucose (or) explain the properties of Glucose.
18). Explain why Glucose, Fructose and Mannose forms the same Osazone ?.
19). Explain the conversion of D-Glucose (Aldohexose) into D-Arabinose (Aldopentose) (or) Explain Ruff`s degradation with an example.
20). Explain the conversion of D-Arabinose(Aldopentose) into D-Glucose (Aldohexose) (or) Explain Killiani-Fischer synthesis with an example.
21). Explain Lobry-de Bruyn-van Ekenstein rearrangement with mechanism.

5). Amino Acids and Proteins:-

22). Explain the Iso-electric point (IEP) and Zwitter ion with examples.
23). Explain any 2-preparation methods for Amino acids e.g. Strecker synthesis & Malonic ester synthesis.

5). Heterocyclic Comopounds:-

24).Explain why Furan participates in Diels-Alder reaction with an example.
25). Explain Paul-Knorr synthesis with examples.
26). Explain the aromaticity and Reactivity order of Furan, Pyrrole & Thiophene.
27). Explain the acidic nature of Pyrrole.
28). Explain Hantsch Pyridine synthesis and Chichibabin reaction of Pyridine.

III). PHYSICAL CHEMISTRY

6). Chemical Kinetics :-

29). Define Rate, order and molecularity of a reaction.
30). Derive the rate equation for 1`st order reactions.
31). Derive the rate equation for 2`nd order reactions.
32). Problems based on 1'st and 2'nd order reactions and Half-life periods.

8). Photochemistry:-

33). Explain the laws of photochemistry (OR)
Explain Grothus-Drapers law and Stark-Einstein's law of photochemical equivalence.
34). Explain Jablonski diagram.
35). Define and give differences between Fluorescence and Phosphorescence.
36). Define Quantum yield and explain the reasons for High and Low quantum yields in some reactions.

IV). GENERAL CHEMISTRY

11). Theory of Bonding in Metals:-

37). Explain Valance Bond Theory(VBT) of Metals.
38). Explain the Band theory of Conductors, Semiconductors & Insulators.
39). What are Semiconductors?. Explain intrinsic, extrinsic, p-type & n-type semiconductors.

5). Carbanions-II:-

40). Explain Mannich reaction and Michael addition with mechanism and examples.
41). Explain Knoevenagal condensation reaction with mechanism and examples.
42). Explain Claissen condensation with mechanism (or) How Ethyl Aceto Acetate is prepared from ethyl acetate?.
43). Explain Acid hydrolysis and Ketonic hydrolysis of Ethyl Aceto Acetate (EAA).
44). How can you prepare Propanoic acid, Butyric acid and Succinic acid from Malonic ester?.

8). Surface chemistry (Adsorption & Colloids) :-

45). Write the differences between Lyophilic and Lyophobic colloids.
46). Explain Kinetic and Optical property (Brownian movement and Tyndal effect) of colloids.
47). What is Coagulation?. Explain Hardy-Schulze`s law and Gold number.
48). Explain Emulsions and Gels.
49). Explain Freundlisch adsorption isotherm.
50). Explain and derive Langmuir adsorption isotherm.

2021-NEW-CBCS-B.Sc-CHEMISTRY- IV-Semester (P-IV)–List of **V.V. Imp Qs (**To get **Pass Marks)**

I) INORGANIC CHEMISTRY

1). Co-ordination Compounds-II :-

1). Explain the important postulates of Crystal Field Theory (CFT).
2). Explain the crystal field (d-orbital) splitting in Octahedral and Tetrahedral complexes.
3). Explain the colour of transition metal aqua complex $[Ti(H_2O)_6]^{+3}$ (or) Explain d-d transitions with an ex.
4). Explain Pearson`s HSAB Rule examples (Or) Explain Pearson`s classification of Hard and Soft Acids and Bases.
5). Explain Thermodynamic stability and Kinetic stability of complexes.
6). Explain the Job`s method for the determination of composition of complexes.
7). Write the applications of complexes in water softening and in analytical chemistry.

2). Bioirganic Chemistry:-

8). Explain the importance of Sodium and Potassium ions in biological systems.
9). Write the structure and functions of Haemoglobin and Chlorophyll.

II). ORGANIC CHEMISTRY

4). Carbohydrates:-

10). Define and give examples for i). Mutarotation ii). Anomers iii). Epimers
11). Explain the formation of Osazone with mechanism.
12). Explain open chain structure of Glucose (or) explain the properties of Glucose.
13). Explain why Glucose, Fructose and Mannose forms the same Osazone ?.
14). Explain the conversion of D-Glucose into D-Arabinose (or) Explain Ruff`s degradation with an example.

5). Amino Acids and Proteins:-

15). Explain the Iso-electric point (IEP) and Zwitter ion with examples.
16). Explain any 2-preparation methods for Amino acids e.g. Strecker synthesis & Malonic ester synthesis.

5). Heterocyclic Comopounds:-

17).Explain why Furan participates in Diels-Alder reaction with an example.
18). Explain Paul-Knorr synthesis with examples.
19). Explain Hantsch Pyridine synthesis and Chichibabin reaction of Pyridine.

III). PHYSICAL CHEMISTRY

6). Chemical Kinetics :-

20). Define Rate, order and molecularity of a reaction.
21). Derive the rate equation for 1`st order reactions.
22). Derive the rate equation for 2`nd order reactions.

8). Photochemistry:-

23). Explain the laws of photochemistry (OR) Explain Grothus-Drapers law and Stark-Einstein's law.
24). Explain Jablonski diagram.
25). Define and give differences between Fluorescence and Phosphorescence.

IV). GENERAL CHEMISTRY

11). Theory of Bonding in Metals:-

26). Explain the Band theory of Conductors, Semiconductors & Insulators.
27). What are Semiconductors?. Explain intrinsic, extrinsic, p-type & n-type semiconductors.

5). Carbanions-II:-

28). Explain Mannich reaction and Michael addition with mechanism and examples.
29). Explain Knoevenagal condensation reaction with mechanism and examples.
30). How can you prepare Propanoic acid, Butyric acid and Succinic acid from Malonic ester?.

8). Surface chemistry (Adsorption & Colloids) :-

31). Explain Brownian movement and Tyndal effect of colloids.
32). What is Coagulation?. Explain Hardy-Schulze`s law and Gold number.
33). Explain Emulsions and Gels.
34). Explain Freundlisch adsorption isotherm.
35). Explain and derive Langmuir adsorption isotherm.