

CHEMISTRY IV SEMESTER IMPORTANT QUESTIONS

- 1) Explain Werner's theory, Sidwick's theory (EAN rule) & Valence bond theory with limitations & applications.
- 2) Explain isomerism in coordination compounds.
(a) Structural (b) Stereoisomerism (i) Geometrical (Square planar & octahedral).
(ii) Optical (Tetrahedral & octahedral).
- 3) Write a note on the classification of organometallic compounds.
- 4) Discuss the preparation & properties of ferrocene.
- 5) Write the preparation, properties & applications of Lithium, Magnesium & Aluminium organometallic compounds.
- 6) Explain 18 valence e⁻ rule in metal carbonyls.
- 7) Discuss the preparation, properties & structure of $Ni(CO)_4$, $Fe_2(CO)_9$, $Co(CO)_6$.
- 8) Discuss the following reactions (a) Huns-Dieckmann (b) Schmidt reaction
(c) Arndt-Eistert (d) HVZ reaction.
- 9) Prepare aliphatic & aromatic carboxylic acids.
- 10) Discuss the chemical properties of reactions involving $-H$, $-OH$ & $COOH$ group of carboxylic acids.
- 11) Prepare ethyl acetoacetate by Claisen condensation.
- 12) Discuss acidic hydrolysis & ketonic hydrolysis.
- 13) Prepare monocarboxylic acids & dicarboxylic acids by AAE.
- 14) Prepare substituted monocarboxylic acids & dicarboxylic acids by malonic ester.
- 15) Explain the following reactions (i) Nef reaction (ii) Mannich reaction
(iii) Michael addition reaction (iv) nitrohydrocarbons with HNO_2 .
- 16) Prepare nitrobenzene by nitration reaction.
- 17) Explain the orientation of electrophilic substitution on nitrobenzene.
- 18) What are specific conductance & equivalent conductance.
- 19) Explain Kohlrausch's law, Arrhenius theory, Ostwald's dilution law, Debye-Huckel-Onsager's equation.

- 20) Define transport number, write its determination by Hittorf's method.
- 21) Define reversible & irreversible cells.
- 22) Explain EMF of a cell & discuss its measurement.
- 23) What are standard hydrogen electrode, calomel electrode, standard electrode potential.
- 24) Discuss the applications of EMF.
- 25) Explain potentiometric titrations.
- 26) Define concerted reaction, & molecular orbitals of 1,3 butadiene, & allylic radical.
- 27) Define HOMO & LUMO.
- 28) Write a note on thermal & photochemical pericyclic reactions.
- 29) Write a note on the types of Pericyclic reactions.
- 30) Define the terms (a) Target molecule (b) Disconnection (c) synthon (d) Synthetic equivalent (e) Functional group interconversion.
- 31) Explain Linear & convergent synthesis.
- 32) Discuss retrosynthetic analysis in the following molecules (i) cyclohexene (ii) phenyl ethyl bromide (iii) acetophenone.
- 33) Write a note on enantiomeric excess & diastereomeric excess.
- 34) Write the classification of Stereoselective reactions. (substrate & product).
- 35) Explain stereospecific reactions by taking an example of debromination of 1,2 dibromide induced by I^- ion.
- 36) Explain enantioselective reaction in the reduction of AA/EAA by yeast.
- 37) Explain diastereoselective reaction in the dehydration (acid catalyzed) of 1-phenyl propanol, & discuss Gignard reagent addition to 2-phenyl propanol.

CHEMISTRY - GRAND TEST - 2018

Sub & Paper: Chemistry - II
Group & year: B.Sc E/M IV sem

Max marks: 80
Time: 3 hours.

Section-A (Short Answer Type) (5x4=20)

- 1) Write the preparation & properties of ferrocene.
- 2) Explain 18 valence rule in metal carbonyls.
- 3) Discuss the following (i) Werner's theory
(ii) preparation of AAE by Claisen condensation
- 4) Explain Nef reaction & Mannich reaction.
- 5) Explain specific conductance & equivalent conductance.
- 6) Define reversible & irreversible cells.
- 7) Define TM, DC, SN, & SE.
- 8) Write a note on enantiomeric excess & diastereomeric excess.

Section-B (Essay Answer Type) (15x4=60)

- 9) (a) Explain Valence bond theory & its application to (a) $Ni(CO)_4$
(b) $[Cu(NH_3)_4]^{+2}$ (c) $[Co(NH_3)_6]^{+3}$.
- (b) Give the classification of organometallic compounds.
(or)
- (c) Write a brief note on Sidgwick's theory & EAN rule.
- (d) Explain geometrical isomerism in square planar complexes & optical isomerism in octahedral complexes by taking suitable examples.
- 10) (a) Discuss the following (i) Huns-Dieckmann reaction.
(ii) Schmidt reaction.
(iii) Arndt-Eistert reaction.
- (b) Prepare substituted monocarboxylic acids & dicarboxylic acids by malonic ester.
(or)

- (c) Discuss the acidity of aromatic, aliphatic acids & phenols.
- (d) Prepare nitrobenzene & explain the orientation of electrophilic substitution on nitrobenzene.
- 11) (a) Explain Kohlrausch's law & Arrhenius theory of electrolytes.
(b) Define transport number & determine it by Hittorf's method.
(or)
(c) Define EMF. And discuss about single electrode potential & standard hydrogen electrode.
(d) Explain the determination of pH using hydrogen electrode, glass electrode & quinhydrone electrode.
- 12) (a) Write about the types of pericyclic reactions, & define HOMO & LUMO.
(b) Explain enantioselectivity by the reduction of AAZ by yeast & diastereoselectivity by acid-catalysed dehydration of alcohol.
(or)
(c) Explain retrosynthesis in the following.
(i) Cyclohexene (ii) Acetophenone (iii) phenyl ethyl bromide.
(d) Write the classification of stereoselective reactions.
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