

**MODEL PAPER**  
**SECOND YEAR B.Sc., DEGREE EXAMINATION**  
**SEMESTER-III**  
**CHEMISTRY COURSE-III: ORGANIC CHEMISTRY &**  
**SPECTROSCOPY**

Time: 3 hours

Maximum Marks: 60

**PART- A**

5 X 4 = 20 Marks

Answer any **FIVE** of the following questions. Each carries **FOUR** marks

1. Discuss two methods for preparation of aryl halides.
2. Explain the mechanism for Pinacol - Pinacolone rearrangement.
3. Discuss the Clemmensen and Wolff-kishner reductions?
4. Explain the effect of substituents on acidic strength of mono-carboxylic acids.
5. Write the mechanism for Claisen Condensation reaction.
6. Write the selection rules in rotational spectroscopy.
7. Explain Spin – Spin coupling and Coupling Constant.
8. Discuss applications of electronic spectroscopy?

**PART- B**

5 X 8 = 40 Marks

Answer **ALL** the questions. Each carries **EIGHT** marks

- 9 (a). Give the mechanism & stereochemistry of  $SN^1$  &  $SN^2$  reactions of alkyl halides with suitable example.
- (or)
- (b). Explain the following reactions with mechanism.  
(i) Reimer-Tiemann reaction (ii) Fries rearrangement.
- 10 (a). Discuss the mechanism for following reactions.  
(i) Perkin reaction. (ii) Cannizzaro reaction

(or)

(b). Write the preparation and any three synthetic applications of melonic ester?.

11.(a). Explain acid and base hydrolysis reaction of esters with mechanism.

(or)

(b). Explain the mechanisms of Curtius rearrangement &

Arndt – Eistert synthesis?

12. (a). (i) Write a note on vibrational degrees of freedom for polyatomic molecules.

(ii) Explain different modes of vibrations & selection rules in IR spectroscopy.

(or)

(b). (i) Define Bathochromic shift. Explain the effect of conjugation in U.V.spectroscopy.

(ii) Discuss the principle of NMR spectroscopy.

13.(a). Write Woodward-Fieser rules for calculating  $\lambda_{\text{max}}$  for conjugated dienes and apply them for three examples?.

(or)

(b).(i) What is Fingerprint region. Explain its significance with an example.

(ii) Write IR spectral data for any one alcohol, aldehyde ?

**MODEL PAPER**  
**SECOND YEAR B.Sc., DEGREE EXAMINATION**  
**SEMESTER-IV**  
**CHEMISTRY COURSE -IV: INORGANIC, ORGANIC &**  
**PHYSICAL CHEMISTRY**

Time: 3 hours  
75

Maximum Marks:

**PART- A**      5 X 5 = 25 Marks

Answer any **FIVE** of the following questions. Each carries **FIVE** marks

1. Describe the 18 electron rule of mono nuclear and polynuclear metal carbonyls with suitable examples.
2. What are epimers and anomers. Give examples.
3. Discuss about iso electric point and zwitter ion.
4. Discuss the Paul-Knorr synthesis of five membered heterocyclic compounds.
5. Explain Tautomerism shown by nitro alkanes
6. Discuss the basic nature of amines.
7. Write the differences between thermal and photochemical reactions.
8. Derive heat capacities and derive  $C_p - C_v = R$

**PART- B**      5 X 10 = 50 Marks

Answer **ALL** the questions. Each carries **TEN** marks

- 9 (a). What are organometallic compounds? Discuss their Classification on the basis of type of bonds with examples.  
(or)
- (b). Discuss the general methods of preparations of mono & bi-nuclear carbonyls of 3d series.
- 10 (a). Discuss the constitution, configuration and ring size of glucose. Draw the Haworth and Conformational structure of glucose.  
(or)
- (b). (i) Explain Ruff's degradation.  
(ii) Explain Kiliani- Fischer synthesis.
- 11.(a). What are amino acids? Write any three general methods of preparation of amino acids.

(or)

(b). Discuss the aromatic character of Furan,  
Thiophene and Pyrrole.

12.(a). Write the mechanism for the following.

(i) Nef reaction (ii) Mannich reaction

(or)

(b).(i) Explain Hinsberg separation of amines.

(i) Discuss any three synthetic applications of diazonium salts.

13.(a). What is quantum yield? Explain the photochemical  
combination of Hydrogen-Chlorine and Hydrogen -  
Bromine.

(or)

(b). Define entropy. Describe entropy changes in the  
reversible and irreversible process.

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# MODEL PAPER

SECOND YEAR B.Sc., DEGREE EXAMINATION

## SEMESTER-IV

### CHEMISTRY COURSE V: INORGANIC & PHYSICAL CHEMISTRY

Time: 3 hours

Maximum Marks: 75

#### PART- A

5 X 5 = 25 Marks

Answer any **FIVE** of the following questions. Each carries **FIVE** marks

1. Write note on Jahn-Teller distortion.
2. Explain Labile & inert complexes.
3. Explain Job's method for determination of composition of complex.
4. Explain Thermodynamic derivation of Gibb's phase rule.
5. Explain any two conductometric titrations.
6. Write note on Fuel Cells with examples and applications.
7. What is enzyme catalysis? Write any three factors effecting enzyme catalysis.
8. Derive Michaels- Menten equation.

#### PART- B

5 X 10 = 50 Marks

Answer **ALL** the questions. Each carries **TEN** marks

9 (a). Explain Valence Bond theory with Inner and Outer orbital complexes. Write limitations of VBT.

(or)

(b). Define CFSE. Explain the factors effecting the magnitude of crystal field splitting energy.

10 (a). Explain Trans effect. Explain the theories of trans effect and write any two applications of trans effect.

(or)

(b). (i) Write the biological functions of Haemoglobin and Myoglobin.

(ii) Write note on use of chelating agents in medicines.

11.(a). Define Phase rule and terms involved in it. Explain phase diagram of Pb-Ag system.

(or)

(b).(i) Explain phase diagram for NaCl-water system.

(ii) Explain briefly about Freezing mixtures.

12.(a). Define Transport number. Write experimental method for the determination of transport number by Hittorf method.

(or)

(b).(i) Define single electrode potential.

(ii) Explain four types of electrodes with examples.

13.(a). Explain general methods for determination of order of a reaction.

(or)

(b). Explain Collision theory and Activated complex theory of bi molecular reactions.