

**RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**  
**SYLLABUS FOR SCREENING TEST FOR THE POST OF**  
**CHEMIST**  
**AYURVED & INDIAN MEDICINE DEPARTMENT**

**General Chemistry-**

Ionization energy, electron affinity, electronegativity, ionic, covalent, coordinate, hydrogen bond, Vander Wall forces, Valence Bond Theory, hybridization, shapes of simple inorganic and organic molecules, VSEPR theory, introduction to Molecular Orbital Theory (MOT) of homo-nuclear and heteronuclear diatomic molecules.

**Basic Organic Chemistry-**

Inductive effect, resonance, hyper-conjugation, isomerism, organic functional groups and their identification tests and nomenclature of organic compounds.

Structure and important properties of alkanes, alkenes, alkynes, alcohols, aldehydes, ketones, carboxylic acids, amines, benzene, phenols, naphthalene, anthracene, furan, pyrole, pyridine and thiophene.

**Reaction Mechanism-**

Types of reagents and reaction intermediates, free radicals, nucleophiles, electrophiles, carbonium ions, carbanions, nitrene, carbene, benzyne, substitution, addition, elimination and rearrangement reactions and aromaticity.

**Name Reactions-**

Aldol Condensation, Baeyer – Villiger oxidation, Birch reduction, Diels – Alder reaction, Friedel-crafts reaction, Haloform reaction, Claisen-Schmidt reaction, Hofmann elimination, Mannich reaction, Pinacol-Pinacolone rearrangement, Reformatsky reaction, Reimer-Tiemann reaction and Wittig reaction.

**Stereochemistry-**

Stereochemistry and conformational analysis of organic compounds, D-L notation, R-S notation, E-Z system of nomenclature, conformations of alkanes and cycloalkanes, optical activity and racemisation.

**Analytical Techniques-**

Volumetric titrimetry (redox, complexometric and acid-base titrations), gravimetric analysis, Karl-Fischer method, potentiometric titrations, conductometric titrations and partition coefficient.

Evaluation of analytical data- significant figures, precision, accuracy, errors, mean, median, mode and standard deviation.

## **Chromatography-**

Principle, instrumentation and applications of the following:

- a) Thin layer chromatography
- b) Paper chromatography
- c) Ion exchange chromatography
- d) Gas chromatography
- e) High performance liquid chromatography

## **Spectroscopy-**

Principle and applications of UV-Visible, IR, Mass and NMR spectroscopy in structure elucidation.

## **Biomolecules-**

Structure, classification and applications of molecules of biological importance - carbohydrates, amino-acids, proteins, enzymes, lipids, steroids, alkaloids, terpenoids and flavonoids.

## **Drugs and Their Applications-**

Drugs in the prevention and treatment of diseases under following category:

- (i) Cardiovascular drugs – Propranolol, Furosemide
- (ii) Antibiotics- Penicillin, Tetracycline
- (iii) Anti-malarial- Chloroquine, Primaquine
- (iv) Anti-pyretic and analgesic- Aspirin, Paracetamol
- (v) Anti-diabetic drugs- Insulin, Metformin
- (vi) Anti-tubercular - Isoniazid, Rifampicin
- (vii) Anticancer drugs- Doxorubicin, Paclitaxel
- (viii) Drugs acting on CNS: Barbiturates, Phenothiazines

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## **Pattern of Question Paper:**

- 1 Objective Type Paper
- 2 Maximum Marks: 150
- 3 Number of Questions: 150
- 4 Duration of Paper: 2.30 Hours
- 5 All Questions carry equal marks
- 6 Medium of Screening Test: Bilingual in English & Hindi
- 7 There will be **Negative Marking**

*(For every wrong answer, one-third of marks prescribed for that particular question will be deducted).*