

**BHARATI VIDYAPEETH**  
**(DEEMED TO BE UNIVERSITY), PUNE, INDIA**  
**PhD Entrance Test – 2026**  
**SECTION-II: Pharmaceutical Chemistry - 35 Marks**

<b>Section II</b>	
<b>1</b>	<b>Spectroscopic Methods</b> - Introduction, Applications and Structure Elucidation using UV, IR, NMR, Mass Spectrometry with examples.
<b>2</b>	<b>Separation Techniques</b> - Theory, Instrumentation, Applications of GLC, HPLC, TLC and HPTLC.
<b>3</b>	<b>Combinatorial Chemistry</b> - Combinatorial approaches , Chemical Peptide and small molecule libraries, Applications, methodology, Combinatorial library synthesis: solid and solution phase, Assays and Screening of Combinatorial libraries
<b>4</b>	<b>Chiral Technology:</b> Introduction to Chirality, Resolution of chiral drugs, asymmetric synthesis of chiral compounds using chiral pools, chiral reagents, chiral catalysts and chiral auxiliaries. Chiral switches.
<b>5</b>	<b>Named reactions: Mechanism and applications of following named reactions</b> Baylis–Hillman reaction, Buchwald–Hartwig C–N and C–O bond formation, Dieckmann condensation, Negishi cross-coupling reaction, Suzuki coupling, Vilsmeier–Haack reaction, Wittig reaction
<b>6</b>	<b>QSAR</b> - a) Parameters - Lipophilicity, electronic, steric factors, b) Quantitative Models -i) Hansch analysis ii) Free Wilson Analysis iii) Mixed approach c) Other QSAR Approaches d) Applications of Hansch Analysis, Free Wilson Analysis.
<b>7</b>	<b>Design and Application of Prodrugs concept</b> a) Prodrug concept, hard and soft drugs b) Classification of prodrugs. c) Prodrugs of various functional groups like carbonyl, hydroxy, amide, amines. d) Application of prodrug approach to : Pharmaceutical, Pharmacokinetic and Pharmacodynamic applications. e) Limitations and drawbacks of prodrug concept.

**References:**

1. Skoog: Principles of Instrumental Analysis (Saunders College Publishing Philadelphia).
2. M. Orchin and H.H. Jaffe - Theory and applications of ultra violet spectroscopy (John Wiley and Sons, N.Y.).
3. Silverstein, Basseler, Morrill - Spectrometric identification of organic compounds (John Wiley and Sons, N.Y.).
4. Willard, Merritt, Dean - Instrumental Methods of Analysis (CBS Publishers and Distributors, Delhi).
5. J.R. Dyer - applications of Absorption Spectroscopy of Organic compounds (Prentice Hall, London).
6. C.N.R. Rao - Chemical applications of Infra-red spectroscopy (Academic press, N.Y.).

7. Higuchi: Instrumental Methods of Analysis.
8. Introduction to Spectroscopy by Donald L Pavia.
9. R.J. Hamilton-Introduction to High Performance Liquid chromatography, (Chapman and Hall, London).
10. Ewing-Instrumental Methods of Chemical Analysis (McGraw Hill Book Co. New York).
11. Burger: Medicinal Chemistry (John Wiley & Sons N.Y.).
12. Foye: Principles of Medicinal Chemistry (Varghese & Co.)
13. Lednicer: Organic Drug synthesis Vol. 1, 2, 3, 4 (John Wiley & Sons N.Y.).
14. Wilson and Gisvold - Text book of Medicinal Chemistry (J.B. Lippincott cam).
15. Stuart Warren: Organic Synthesis – The Disconnection Approach (John Wiley & Sons).
16. Poul Krogsgaard Larsen: A text book of Drug Design and Development First Edi.
17. Pandi Veerapandian - Structure Based Drug design.
18. Thomas J. Perum, C.L. Propst - Computer Aided Drug Design.
19. Jie Jack Li Name Reactions

\* \* \*