

BHARATI VIDYAPEETH
(DEEMED TO BE UNIVERSITY), PUNE, INDIA
PhD Entrance Test – 2025
SECTION-II: Pharmaceutical Chemistry - 35 Marks

| Section II | |
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| 1 | Spectroscopic Methods - Introduction, Applications and Structure Elucidation using UV, IR, NMR, Mass Spectrometry with examples. |
| 2 | Separation Techniques - Theory, Instrumentation, Applications of GLC, HPLC, TLC and HPTLC. |
| 3 | Combinatorial Chemistry - Combinatorial approaches , Chemical Peptide and small molecule libraries, Applications, methodology, Combinatorial library synthesis: solid and solution phase, Assays and Screening of Combinatorial libraries |
| 4 | Chiral Technology: Introduction to Chirality, Resolution of chiral drugs, asymmetric synthesis of chiral compounds using chiral pools, chiral reagents, chiral catalysts and chiral auxiliaries. Chiral switches. |
| 5 | Named reactions: Mechanism and applications of following named reactions 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 |
| 6 | QSAR - 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. |
| 7 | Design and Application of Prodrugs concept 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

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