

I. Basic Principles of Rasashastra and Bhaishajya kalpana

1. Basic concept of Rasashastra (Adharabhuta Siddhanta) and concept of Rasachikitsa.
2. History and Chronological evolution of Rasa sashtra , Concept of Raseshwara darshana.
3. Detailed knowledge of ancient and contemporary instruments and their modification used in manufacturing of Rasaaushadies in small scale and large scale along with their applications.
4. Study of samskara ,role of agni(heat),jala(water) and other dravas(liquids), kala (season),Patra(container)etc and their signifiacance.
5. Concept of Bhavana and Mardhana and its significance. Knowledge of ancient and contemporary grinding techniques.
6. Detailed knowledge of Sodhana ,Jarana,Murchana, Marana, Amritheekarana and lohitheekarana. Bhasma pareeksha vidhi and its significance in relation to contemporary testing procedures.
7. Detailed knowledge of satwa and druti.
8. Concept of Pratinidhi (substitute) dravya and discussion on controversial drugs.
9. History and chronological evaluation of bhaishajya kalpana, concept of bshesaja and aushada,fundamental principles of bhaishajya kalpana. Technical terminologies (paribhasha) used in bhaishajya kalpana.
10. Classical and contemporary concept of collection, preservation, and storage of fresh and dry drugs.
11. Detailed knowledge of routes of drug administration, Posology, Anupana, Sahapana, Aushada Sevana Kala, Pathya and Apathya.

II. Understanding the Metals and Minerals used in Ayurveda .

1. Detailed ancient and contemporary knowledge of Parada (Mercury).
2. Detailed ancient and contemporary knowledge Of Maharasa, Uparasa, Sadharana Rasa, Dhatu, Upadhatu, Ratna, Uparatna, Visha , Upavisha,Sudha Varga,Vavana Varga, Kshara Varga, Sikata Varga and other miscellaneous drugs used in Rasasashtra.

III. Basic concepts of Modern Metallurgy.

Geochemical /Mineralogical , biological identification, source, occurrence, physico – chemical characterization of various metal and minerals used in Ayurveda.

IV. Pharmacy Management

1. Scope and evolution of Pharmacy
2. Management of pharmacy, Storage and inventory management, Personnel management
3. Good manufacturing practices related to Ayurvedic drug industry
4. Detailed knowledge of Pharmacovigilance- National and International Scenario. Pharmacovigilance of Ayurvedic drugs.
5. Packing material and labelling
6. Pharmaceutical marketing, product release and withdrawals
7. Patenting and Intellectual property rights.
8. Knowledge about good collection and storage practice (GCP and GSP) as per WHO and NMPB guidelines

V. Laws governing Ayurvedic drugs

- i. Relevant regulatory provisions of Ayurvedic drugs in Drugs and Cosmetic Act-1940 and Rules-1945.
- ii. Laws pertaining to Drugs and magic remedies (Objectionable Advertisement) Act-1954.
- iii. Prevention of Food Adulteration (PFA) Act.
- iv. Food Standards and Safety Act-2006
- v. Laws pertaining to Narcotics.
- vi. Factory and Pharmacy Acts
- vii. Consumer Protection Act-1986
- viii. Knowledge of Good clinical practices and inspection manual prescribed by Dept. Of AYUSH, Govt. of India.
- ix. Regulatory Affairs related to International trade and practices of Ayurvedic drugs.

- x. Knowledge of regulations in relation to alcoholic drug preparations.

VI. Knowledge of different official databases.

Introduction to Ayurvedic pharmacopeia of India, Ayurvedic Formulary of India, Indian Pharmacopeia, British and United States Pharmacopeia, Pharmacopeial Codex, databases of medicinal plants published by CCRAS, ICMR and others and Traditional knowledge Digital library.

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I. Preclinical evaluation

1. Experimental pharmacology [Bioassay, In-vitro, in-vivo, cell line studies], Animal ethics.
2. Knowledge of toxicity and pharmacological activities of Herbo-mineral compounds

II. Clinical Pharmacology

1. Evaluation of new chemical entity- Phases and methods of clinical research.
2. Ethics involved in Human research.

III. Knowledge of Drug Analysis in herbal and herbo-mineral preparations.

1. Introduction to advance instruments of analysis like XRD, XRF, SEM-E-Dax, FTIR and ICP analysis.
2. Chromatography : TLC, Gas chromatography, Spectrometry and HPTLC.
3. Concept of Nanotechnology and its relevance to preparation of medicines.
4. Detailed knowledge of quality control and Pharmacopeial standards of
 - a. Panchavidha kasaya kalpana, churna, avaleha kshirapaka, arka, satva, kshara, lavana, gutika, guggulu, and varti, etc.....
 - b. Sneha kalpana
 - c. Sandhana kalpana.
 - d. Bahya prayogarthas kalpana.
 - e. Netrapachararthas kalpana.
5. Detailed knowledge of quality control and pharmacopeial standards of

- a. Bhasmas
- b. Pishti
- c. Kharaliya rasa
- d. Parpati
- e. Kupipakva rasa
- f. Pottali rasa
- g. Dravaka.

IV. General Pharmacology

1. Principles of Pharmacology, Pharmacodynamics and Pharmacokinetics: Absorption, distribution, metabolism and excretion, mechanism of action, dose determination and dose response, structure activity relationship.
2. Routes of drug administration.
3. Factors modifying drug effect, bioavailability and bioequivalence, drug interactions, adverse drug reaction and drug toxicity.

V. Introduction to Pharmaceutics

1. Detailed knowledge of manufacturing, development of innovative technology with standard operating procedures of processing and standardization of Bhasmas, Pishti, Kharaliya rasa, Parpati, Kupipakva rasa and Pottali rasa
2. Detailed knowledge of manufacturing, development of innovative technology with standard operating procedures of processing and standardization of following dosage forms.
 - a. Panchavidha kasaya kalpana, churna, rasakriya, Ghana, avaleha, pramathya, mantha, panaka, sarkara, kshitrupaka, ushnodaka, aushadha siddha udaka, arka, satva, kshara, lavana, masi, gutika, vatika, modaka, gutika, vatika, modaka, guggulu, and varti, etc.....
 - b. Sneha kalpana,
 - c. Kritanna and Bheshaja siddha anna kalpana, Shuka and shimbi dhanya kalpana, dugdha, Dadhi and Takra Vikara and mansaradi rutanna kalpana, Aharopayogi varga , etc.

- d. Sandhana kalpana: Madya varga and shukta varga
- e. Bahya prayogarthā kalpana: Lepa, Upanaha, Avaachurnana/ Avadhulana,
Abhyanga, Dhupana, Malahara.
- f. Mukha, Karna, Nasa, Netrapacharartha kalpana.
- g. Basti kalpana
- h. Methods of Expression and Extraction: Maceration, Percolation, Distillation,
Infusion and Decoction Knowledge about filtration techniques.
- i. Drying open and closed air drying, freeze drying, vacuum drying and other
drying methods pharmaceutical excipients.
- j. Liquids: Clarified liquid, Syrup, Elixir.
- k. Solid dosage forms: Powders: Size reduction, Separation techniques, particle size
determination, Principles of mixing.
- l. Tablets : Methods of tableting, Suppositories, Pessaries and Capsules, Sustained
release dosage forms.
- m. Semisolid dosage forms – Emulsions, Suspensions, Creams and
Ointments, Sterilization of Ophthalmic preparations.
- n. Cosmetic preparations such as Toiletries, Shampoo, Shaving creams, Hair oils
Face powders (Talcum powders). Vanishing creams, Lotions and
Moisturisers, Face pack, Deodorants and Perfumes.
- o. Concept of medicinal and functional food, Dietary supplements and nutraceuticals

TEXT BOOKS/ REFERENCES:

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Sanskrit Sansthan ,Varanasi, 7th edition 1999.
- 2) Asha kumari and Premavati Tewari ,Yogaratanakara ,English commentary, 1st edition, 2010.
- 3) Acharya Sharngadhara ,Sharngadhara Samhita ,Dipika Hindi Commentary by
Dr. Brahmananda Tripathy, Chaukambha Surabharaty Prakashan ,Varanasi, reprint 2011.

- 4) Sri Sadananda Sharma, Rasatharangini ,Hindi translation by Kashinatha Sastri,Motilal Banarasidas,11th edition ,2012
- 5) Sri Govinda Das ,Bhaishajya Ratnavali,English translation by Kanchiv Lochan,Chaukambha Sanskrit Sanstan,reprint 2008.
- 6) Nagindas Chaganlal Shah,Bharat Bhaishajya Ratnakara,B.Jain publishers pvt.ltd,New Delhi, reprint 2005
- 7) Vaidya pandit Hariprapanna sharma,Rasayoga sagara ,Chaukambha Krishnadas Acadamy , Varanasi,reprint 2010.
- 8) Sri Bhava misra ,Bhavaprakasha ,Vidyotini Hindi commentary by Bramha Sankra Misra ,Chaukambha Sanskrit Bhavan ,Varanasi,reprint 2010.
- 9) Dr.Indradev Tripathy,Rasarnava,Rasachandrika Hindi commentary,Chaukambha Sanskrit Series Varanasi,Reprint 2012.
- 10) Acharya Sri Madhava,Ayurveda Prakasha ,Sanskrit and Hindi commentary by Sri Gulraj Sharma Mishra,Chaukambha Bharati Academy,Varanasi,Reprint 1999.
- 11) Acharya Vagbhata,Rasaratna samuchaya ,English Translation By Dr.A .D Satpute ,Chaukambha Sanskrit pratishtan,Varanasi,1st edition, 2003
- 12) KD Tripathi, Clinical Pharmacology,Jaypee Brothers Medical publishers (p)Ltd,7th edition,2013
- 13) Kailash Chandra ,B.G. Chaudhari B.P.Dhar ,G.V.R.Joseph ,A.K.Mangal, Rajesh Dabur,Tushar K. Mandal, Arun M. Gurav ,M.B. Yelne ,S.P. Singh, Data base of Medicinal plants of CCRAS,,volume 8,2007
- 14) Neeraj Tandon&Poul Sharma ,Quality and Standards of Medicinal plants ,ICMR ,Govt.of India,2014.
- 15) Ayurvedic Pharmacopeia of India,Ayush,Ministry of health and welfare ,1st edition,2008.
- 16) Ayurvedic Formulary of India,Ministry of health and welfare ,1st edition,2011.
- 17) Ashok K Gupta, Introduction to Pharmaceutics-1 CBS Publishers & Distributors, New Delhi, 3rd Edition, 1994.
- 18) Ashok K Gupta, Introduction to Pharmaceutics-2 CBS Publishers & Distributors, New Delhi, 4th Edition, 2000.
- 19) R.M. Mehta, Pharmaceutics-2, Vallabh Prakashan, Delhi,2nd Edition,2003.