

5. RASA SHASTRA AND BHAISHAJYA KALPANA

Paper I Rasa Shastra

Part A

1. History and Chronological evolution of Rasashastra, concept of Raseshwara darshan. Fundamental Principles of Rasashastra Technical terminologies (Paribhasha) used in Rasa shastra.
2. Detailed knowledge of ancient and contemporary Yantropakarana and their accessories used in aushadhikaran and their contemporary modification such as yantras, mushas, putas, Koshtis, bhrashtis, muffle furnaces and other heating appliances, ovens, driers etc. used in manufacturing of Rasaushadhis in small scale and large scale along with their applications.
3. Study of Samskara, Role of agni (Heat), jala and other dravas (water and other processing liquids), kala (Time span), paatra (container) etc. and their significance in aushadhikarana.
4. Concept of Bhavana, study of Mardana and its significance and knowledge of ancient and contemporary grinding techniques.
5. Detailed Knowledge of different procedures of Shodhana, Jarana Murchana and Marana, concept of Puta, definition, types and specifications of different Putas. Significance of different Putas in relation to Bhasmikanana and therapeutic efficacy of dravya under process. Bhasma pariksha vidhi and its significance in relation to contemporary testing procedures. Amritikaran and Lohitikarana.
6. Detailed knowledge of Satva and Druti, Satva shodhan, mrudukaran and Maran of Satva, its significance, in relation to therapeutic efficacy of dravya under process.
7. Concept of Pratinidhi dravya and discussion on controversial drugs.

PART – B

1. Detailed ancient and contemporary knowledge of Parada and its compounds with reference to source, occurrence, physico-chemical characterization, graahya agrahyatva, Parada dosha, Parada gati, Parada shodhan, Study of Ashta sanskara, ashtadasha sanskara etc., Hingulottha Parada. Concept of Parada jaran, moorcchana, bandhan, pakshaccheda and marana etc. Therapeutic properties and uses of Parada.
2. Detailed ancient & contemporary knowledge with Geochemical / mineralogical / biological identification, source, occurrence, physico-chemical characterization, graahya-agraahyatva, Shodhan Maranadi vidhi and therapeutic properties and uses of dravyas etc. included in Maharasa, Uparasa, Sadharana rasa, Dhatu, Upadhatu, Ratna, Uparatna, Visha, Upavisha, Sudha varga, Lavana varga, Kshara varga, Sikata varga and other miscellaneous drugs used in Rasashastra.
3. Detailed knowledge of manufacturing, pharmacopeial standards, storage, shelf life, therapeutic efficacy, dose, anupana, vikarashanti upaya and development of technology with Standard Operating Procedures of processing, standardization, quality control of Bhasmas and Pishtis

Bhasma - Abhraka Bhasma, Svarnamakshika Bhasma, Kasis Bhasma, Svarna Bhasma, Rajata Bhasma, Tamra Bhasma, Loha Bhasma, Mandur Bhasma, Naga Bhasma, Vanga Bhasma, Yashad Bhasma, Trivanga Bhasma, Pittala, Kamsya and Varthaloha Bhasma, Shankha Bhasma, Shukti Bhasma, Kapardika Bhasma, Godanti Bhasma, Praval Bhasma, Mrigashringa Bhasma, Mayurpiccha Bhasma, Kukkutand twak Bhasma, Hiraka Bhasma, Manikyaa Bhasma.

Dravaka - Shankha Dravaka

Pishti - Praval pishti, Manikya Pishti, Mukta pishti, Jahara mohara pishti, Trinakanta mani pishti etc.

4. Detailed knowledge of manufacturing, storage, shelf life, pharmacopeial standards, therapeutic efficacy, dose, anupana and development of technology with Standard Operating Procedures of processing, standardization and quality control of Kharaliya rasa, Parpati, Kupipakva rasa and Pottali rasa.
5. Study of classical texts with respective commentaries and special emphasis on Rasarnava, Rasahridaya tantra, Rasa Ratna Samucchaya, Rasendra Chintamani, Rasendra Chudamani, Rasa Ratnakara, Rasadhyaya, Rasa Kamdhenu, Anandkanda, Siddha Bhesaja Manimala, Ayurveda Prakash, Rasatarangini, Bhaishajya Ratnavali, Rasamritam etc. and the books mentioned in the Schedule I of D & C Act – 1940. Relevant portions of Brihatrayi.

Paper II Bhaishajya Kalpana

Part A

1. History and Chronological evolution of Bhaishajya Kalpana, Concept of Bhesaja and Aushadh, fundamental principles of Bhaishajya Kalpana. Technical terminologies (Paribhasha) used in Bhaishajya Kalpana.
2. Classical and Contemporary concepts of Collection, storage, Saviryata Avadhi and preservation methods of different fresh and dry Aushadhi dravyas and their graahya agraahyatva
3. Detailed knowledge of routes of drug administration, Aushadha matra, Anupana, Sahapana, Aushadha Sevana Kala, Kala Avadhi, Pathya, Apathya (Posology).
4. Detailed knowledge of manufacturing, standardization, quality control, pharmacopeial standards, storage, shelf life and development of innovative technology with Standard manufacturing Operating Procedures of following dosage forms
 - i) Panchavidha Kashaya, Churna, Rasakriya, Ghana, Avaleha, Pramathya, Mantha, Panaka, Sarkara, Kshirapaka, Ushnodaka, Aushadha Siddha Udaka, Sadangodaka, Tandulodaka, Laksharasa, Arka, Satva, Kshara, Lavana, Masi, Gutika, Vatika, Modaka, Guggulu and Varti etc.
 - ii) Sneha Kalpana: Concept of accha sneha and sneha pravicharana and Murchhana. Sneha paka, types of sneha paka and sneha siddhi lakshana, Avartana. Sneha kalpa karmukata (Pharmacokinetics and dynamics of sneha kalpa). Role of Sneha in relation to absorption of drug.
 - iii) Kritanna and Bhesaja Siddha Anna Kalpana, Aharopayogi varga, concept of medicinal and functional food, dietary supplements and nutraceuticals etc.
 - iv) Sandhana kalpana: Madya varga and Shukta varga. Asava yoni. Alcoholic and acidic fermentation. Sandhana kalpa karmukata (Pharmacokinetics and dynamics). Advancements in fermentation technology. Knowledge of regulations in relation to alcoholic drug preparations.
 - v) Bahya Prayogartho Kalpana : Lepa, Upanaha, Udvartan, Avachurnana / Avadhulana, Abhyanga, Dhupana, Malahara.
 - vi) Mukha, Karna, Nasa, Netropacharartho Kalpana:

- vii) Basti Kalpana: Basti Yantra Nirmana, Types of basti. Anuvasana and Asthapana basti. Karma, kala and yoga basti etc. Basti Kalpa (Madhutailika, Piccha basti etc.), Comparison of Asthapana and Anuvasana basti with evacuation and retention enema.

Part B

All the following procedures are to be studied in relevance to Ayurvedic Bhaishajya Kalpas.

1. Methods of Expression and Extraction: Maceration, percolation, distillation, infusion and decoction.
2. **Liquids:** Clarified liquid, syrup, elixir, filtration techniques
3. **Solid dosage Forms: Powders:** Size reduction, separation techniques, particle size determination, principles of mixing. **Tablets:** Methods of tableting, suppositories, pessaries and capsules, sustained release dosage forms.
4. **Semisolid dosage forms,** emulsions, suspensions, creams and ointments, sterilization of ophthalmic preparations.
5. An introduction to various cosmetic preparations.
6. Drying, open and closed air drying, freeze drying, vacuum drying and other drying methods pharmaceutical excipients.
7. Study of classical texts with special emphasis on Chakradatta, Sharangadhara Samhita, Bhaishajya Ratnavali, Bhava Prakasha, Yogaratnakara, relevant portions of Brihatrayi, Ayurvedic Pharmacopeia of India, Ayurvedic Formulary of India.

Paper III Rasa Chikitsa & Aushadha Yoga Vigyana

PART- A

1. Rasachikitsa, Kshetrikaran, Rasajirna, Lohajirna, Aushadhi Sevana Vikarashanti Upaya. Ashuddha, Apakva, Avidhi Rasadravya Sevanajanya Vikara evam Vikara shanti upaya.
2. Detailed knowledge of Aushadhi patha Nischiti and sanyojan (formulation composition), dose, anupana and method of administration, therapeutic efficacy and uses (indications and contra-indications), probable mode of action etc. of the following Aushadhi yogas
 - i. **Kharaliya Rasa :** Shwasa kuthara Rasa, Tribhuvana kirti Rasa, Higuleshwara Rasa, Ananda bhairava Rasa, Maha Lakshmilasa Rasa, Vasnata kusumakara Rasa, Vasanta malti Rasa, Brihat vata chintamani Rasa, Laghu suta shekhar Rasa, Suta shekhara Rasa, Ram ban Rasa, Chandra kala Rasa, Yogendra Rasa, Hridayarna rasa, Grahani kapata Rasa, Garbha pala Rasa, Jalodarari Rasa, Mrityunjaya Rasa, Madhumalini vasanta Rasa, Arsha kuthara Rasa, Krimi mudgara Rasa, Suchika bharana Rasa, Tri netra Rasa, Smruti sagara Rasa, Vata gajankusha Rasa, Agni kumar Rasa, Ekangavir Rasa, Kama dugha Rasa, Purna chandrodaya Rasa, Pratap lankeshwara Rasa, Maha vata vidhwansaka Rasa, Kasturi bhairava Rasa, Ashwa kanchuki Rasa, Gulma kuthara Rasa, Maha jwarankusha Rasa, Chandra mrita Rasa, Kapha ketu Rasa, Prabhakara Vati, Pravala Panchamrita, Gandhaka Rasayana, Chaturbhuj rasa, Navajivan rasa, Shonitargal rasa, Raktapitta kulakandan rasa, Amavatari Rasa, Kravyada Rasa, Garbha chintamani Rasa, Chintamani Rasa, Trilokya chintamani Rasa, Pradarantaka Rasa, Vangeshwara Rasa, Brihat vangeshwara Rasa, Shwasakasa Chintamani Rasa, Arogya vardhini Vati, Chandra prabha Vati, Agni tundi vati, Shankha Vati.

- ii. Kupipakva Rasa:** Rasa Sindura, Makaradhwaja, Sidha makaradhwaja, Samira pannaga Swarnavanga, Malla sindura, Rasa karpura, Rasa pushpa, Manikya Rasa.
- iii. Parpati Rasa :** Rasa Parpati, Loha Parpati, Tamra Parpati, Suwarna Parpati, Gagana Parpati, Vijay Parpati, Panchamrit Parpati, Shwet Parpati, Bola Parpati
- iv. Pottali Rasa:** Rasagarbha pottali, Hemagarbha pottali, Mallagarbha pottali, Hiranyagarbha pottali, Shankagarbha pottali, Lokanatha rasa, Mriganka Pottali
- v. Loha evam Mandura Kalpa:** Ayaskriti, Loha Rasayana, Amla pittantaka loha, Chandanadi loha, Dhatri loha, Navayasa loha, Putapakva vishama jwarantaka loha, Shilajatwadi loha, Tapyadi loha, Saptamrita loha, Dhatri loha Amritasara Loha, Shankaramat loha, Pradarantaka loha, Rohitaka loha, Punarnava Mandura, Shatavari Mandura, Tara Mandura, Triphala Mandura, Mandura Vataka etc.

Part B

Detailed knowledge of Aushadhi patha Nischiti and sanyojan (formulation composition), dose, anupana and method of administration, therapeutic efficacy and uses (indications and contra-indications), probable mode of action etc. of the following Aushadhi yogas

- i. Panchavidha Kashayas and their Upakalpa:** Ardraka swarasa, Tulasi swarasa, Vasa putapaka swarasa, Nimba kalka, Rasona kalka, Kulattha Kwath, Punarnavasthaka kwatha, Rasna saptaka kwatha, Dhanyak hima, Sarivadi hima, Panchakola phanta, Tandulodaka, Mustadi pramathya, Kharjuradi mantha, Shadanga paniya, Laksha rasa, Arjuna kshirapaka, Rasona kshirapaka, Chinchana panaka, Candana panaka, Banapsha sharkara, Nimbu sharkara, Amrita satva, Ardraka satva, Ajamoda arka, Yavanyadi arka
- ii. Kritanna and Bheshaja Siddha Ahara Kalpana:** Yavagu, (Krita and Akrita), Ashtaguna manda, Laja manda, Peya, Vilepi, Krishara, Yusha, Mudga yusha, Kulattha yusha, Saptamushtika yusha, Khada, Kambalika, Raga, Shadava, Mamsarasa, Veshavara, Dadhi, Katvar Dadhi, Dadhi Mastu, Takra, Gholi, Udasvita, Mathita, Chhacchika etc.
- iii. Churna:** Sitopaladi Churna, Talisadi Churna, Triphala Churna, Hingvashtaka Churna, Avipattikara Churna, Swadishta Virechana Churna, Bhaskar Lavana Churna, Sudarshana Churna, Maha Sudarshana Churna, Gandharva Haritaki Churna, Pushyanuga Churna, Ajamodadi Churna, Hingvadi Churna, Eladi Churna, Dadimashtaka Churna, Trikatu Churna, Vaishwanara Churna, Gangadhara Churna, Jati phaladi Churna, Narayana Churna etc.
- iv. Gutika:** Arogya vardhani vati, Chandra prabha vati, Chitrakadi Gutika, Sanjivani Vati, Lasunadi vati, Lavangadi Vati, Vyoshadi vati, Khadiradi Vati, Kankayana Vati, Abhayadi modaka, Marichyadi gutika, Amalakyadi gutika, Samshamini Vati, Kutaja Ghana vati, Amarasundari Vati, Shiva Gutika, Eladi Vati, Kasturyadi Gutika, Arshoghni Vati.
- v. Guggulu:** Yogaraja Guggulu, Maha yogaraja Guggulu, Trayodashanga Guggulu, Kanchanara Guggulu, Rasnadi Guggulu, Triphala Guggulu, Simhanada Guggulu, Gokshuradi Guggulu, Kaishora Guggulu, Panchatikta Guggulu, Amritadi Guggulu, Vatari Guggulu, Lakshadi Guggulu, Abha Guggulu, Navaka Guggulu, Nava Karshika Guggulu.
- vi. Sneha Kalpa**
 - Sneha Moorchhana** - Ghrita Murchana, Taila Murchhana
 - Siddha Ghrita** - Shatavari Ghrita, Jatyadi Ghrita, Phala Ghrita, Dadimadi Ghrita, Kshirashatpala Ghrita, Mahatriphala Ghrita, Dhanvantari Ghrita, Amritaprasha Ghrita, Kalyanaka Ghrita, Brahmi Ghrita, Changeri Ghrita, Panchatikta Ghrita, Sukumara Ghrita, Panchagavya Ghrita
 - Siddha Taila** - Maha Narayana Taila, Maha Masha Taila, Bala Taila, Nirgundi Taila, Shadbindu Taila, Vishagarbha Taila, Sahacharadi Taila, Jatyadi Taila, Apamarga Kshara Taila, Tuvaraka Taila, Kshirabala Taila (Avartita), Lakshadi Taila, Anu Taila, Kumkumadi Taila, Hingutriguna Taila, Kottumchukadi Taila, Prasarinyadi Taila,

Dhanwantari Taila, Balashwagandhadi Taila, Balaguduchyadi Taila, Nilibhringyadi Taila, Brihadavadi Taila, Irimedadi Taila, Chandanadi Taila, Panchaguna taila, Arka taila, Pinda Taila, Kasisadya Taila

vii. Rasakriya, Avaleha, Khanda etc.: Darvi Rasakriya, Vasa Avaleha, Brahma rasayana, Chyavanprasha Avaleha, Kushmanda Avaleha, Dadima Avaleha, Bilvadi Avaleha, Kantakaryavaleha, Haridra Khanda, Narikela khanda, Saubhagya shunthi paka, Amrita Bhallataka, Kamsa Haritaki, Chitraka Haritaki, Vyaghri Haritaki, Bahushala Guda, Kalyana Guda

viii. Sandhana Kalpa: Lodhrasava, Kumaryasava, Ushirasava, Chandanasava, Kanakasava, Sarivadyasava, Pippalyasava, Lohasava, Vasakasava, Kutajarishta, Draksharishta, Raktamitrarka, Dashamularishta, Abhayarishta, Amritarishta, Ashokarishta, Sarasvatarishta, Arjunarishta, Khadirarishta, Ashwagandha Arishta, Vidangarishta, Takrarishta, Mahadrakshasava, Mritasanjivani sura, Maireya, Varuni, Sidhu, Kanji, Dhanyamla, Madhu Shukta, Pindasava.

ix. Anya Kalpa : Phala varti, Chandrodaya varti, Arka lavana, Narikela lavana, Triphala masi, Apamarga kshara, Snuhi kshara, Ksharasutra, Atasi upanaha, Sarjarasa malahara, Gandhaka malahara, Sindhuradi Malahara, Shatadhouta Ghrita, Sahasra Dhouta Ghrita, Sikhtha taila, Dashanga lepa, Doshaghna lepa, Bhallataka taila patana, Jyotishmati Taila, Bakuchi Taila, Dashanga dhupa, Arshoghna dhupa, Nishadi Netra bindu, Madhutailika Basti, Piccha Basti, Yapana Basti.

PAPER – IV Pharmacology and Pharmacy Management

PART - A

1. General Pharmacology:
 - a) Principles of Pharmacology, Pharmacodynamics & Pharmacokinetics: Absorption, distribution, Metabolism & excretion, mechanism of action, dose determination and dose response, structure activity relationship.
 - b) Routes of drug administration
 - c) Factors modifying drug effect, Bioavailability and Bioequivalence, drug interactions, adverse drug reaction and drug toxicity
 - d) Preclinical evaluation: experimental pharmacology [bioassay, in vitro, in vivo, cell line studies] animal ethics.
2. Clinical pharmacology: Evaluation of New Chemical Entity – phases and methods of clinical research. Ethics involved in human research.
3. Elemental constituents of human body and its physiological importance. Deficiencies and excess of various elements (micro-nutrients).
4. Toxicity of heavy metals and chelation therapy.
5. Knowledge of toxicity and pharmacological activities of herbo-mineral compounds.
6. Detailed Knowledge of Pharmacovigilance – National and International Scenario. Pharmacovigilance of Ayurvedic Drugs

Part B

1. Scope and evolution of pharmacy. Information resources in pharmacy and pharmaceutical Science.
2. Pharmaceutical dosage form design (Pre-formulation)
3. Packaging materials and Labeling
4. Management of pharmacy, store and inventory management, personnel management, Good Manufacturing Practices related to Ayurvedic drug industry.
5. Pharmaceutical Marketing, product release and withdrawals.
6. Hospital, Dispensing and Community pharmacy.
7. Patenting and Intellectual Property Rights.
8. Laws Governing Ayurvedic drugs

- i. Relevant regulatory provisions of Ayurvedic drugs in Drug and Cosmetics 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
- 9.** Regulatory Affairs related to International Trade and Practices of Ayurvedic Drugs
10. Introduction to Ayurvedic Pharmacopoeia of India, Ayurvedic Formulary of India.
11. Introduction to Indian Pharmacopoeia, British and United States Pharmacopoeia, Pharmacopoeial Codex
12. Introduction to Traditional Knowledge Digital Library

Practicals:-

Minimum 150 Practical are to be performed covering all the dosage forms.
 Educational Visits to minimum Five (5) GMP approved Ayurvedic Pharmacies.
 Ten days posting in R & D / Production unit in GMP certified Ayurvedic Pharmacy.
 Minimum attendance in three National Conferences within three academic years.
 Minimum 10 clinical cases using different dosage forms are to be studied and recorded for efficacy and ADRs (if any).
 Minimum one research paper on the core contributory work of dissertation published or accepted in peer reviewed, indexed journal.
 Examinee has to submit supporting documents in relation to above mentioned academic activities at the time of Practical examination.

Pattern of Practical Examination

Total Marks : 100

Duration of the practical: 2 days

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|-------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. Identification of the specimen: | 10 Marks |
| 2. Drug Processing | 30 Marks |
| | (10+10+5+5) |
| i) Major Practicals: 2 (1 Rasashastra and 1 Bhaishajya Kalpana) | |
| ii) Minor Practicals: 2 (1 Rasashastra and 1 Bhaishajya Kalpana) | |
| 3. Drug testing and Analysis | 10 Marks (5+5) |
| i) Rasaushadhi - 1 | |
| ii) Kashthaushadhi - 1 | |
| 4. Power Point Presentation on dissertation work: 15 Minutes | 10 Marks |
| 6. A Demo Lecture on any subject topic: 10 Minutes. | 10 Marks |
| 7. Documentation | 15 Marks |
| i. Journals (Practical Records) of minimum 75 practicals (25 each from Rasa Shastra, Bhaishajya Kalpana and Analytical part). | |
| ii. Reports of the Visits | |
| iii. Case Records | |
| 8. Viva Voce examination | 15 Marks |

Reference Books:-

1. Rasahridaya Tantra
2. Rasarnava

3. Rasaratna Samuccahaya
4. Ayurved Prakasha
5. Rasendrachudamani
6. Rasendra Chintamani
7. Rasatarangini
8. Rasapraksha Sudhakar
9. Rasamrita
10. Rasa Chandanshu : CCRAS Publication
11. Sharangadhara Samhita
12. Sharangadhara Darpan (BP Pandey)
13. Bhavaprakasha
14. Yoga Ratnakara
15. Bhaishajya Ratnavali
16. Siddha Bhaishajya Manimala
17. Ayurvediya Aushadhikarana – Puranik and Dhamanakar
18. Bharat Bhaishajya Ratnakara
19. Rasayoga Sagara
20. Siddha Bhaishajya Manimala
21. Siddha Yoga Sangraha – Yadavaji Trikamji Acharya
22. Sahasrayoga
23. Vaidyaka Paribhasha Pradeepa
24. Dravyaguna Vijnan Part - 1 and 2 - Yadavji Trikamji
25. Chakradatta - Ratnaprabha,
26. Relevant Parts from Charaka Samhita, Sushruta Samhita, Kashyapa Samhita, Ashtanga Sangraha, Ashtanga Hridaya,
27. Remington: Science and Practice of Pharmacy
28. Theory and Practice of Industrial Pharmacy – Leon Lachman *et al*
29. Clinical Pharmacology, KD Tripathi
30. Clinical Pharmacology, Lawrence Benette
31. Drug Discovery and Evaluation (Pharmacological assays) HG Vogel
32. Pharmacological Basis of therapeutics – Goodman and Gilman
33. Data Base of Medicinal Plants of CCRAS
34. Quality and Standards of Medicinal Plants – ICMR publication
35. Quality Control of Ayurvedic Drugs – PLIM, Gaziabad
36. Ayurvedic Pharmacopeia of India
37. Ayurvedic Formulary of India
38. Indian Pharmacopeia
39. British Pharmacopeia
40. United States Pharmacopeia
41. Pharmacopeia Codex
42. Current Good Manufacturing Practices
43. Drugs and Cosmetic Act 1940 and Rules 1945 with latest amendments
44. Drugs and Magic remedies (Objectionable advertisement) Act-1954
45. Prevention of Food Adulteration (PFA) act
46. Laws pertaining to Narcotics
47. Factory and Pharmacy Acts
48. Consumer Protection Act -1986
49. Brief information on the peer reviewed journals, official websites and other official search engines along with their links (related with the subject)
50. Rutleys Elements of Mineralogy
51. Bhasma Vigyaniam
52. Kupipakva Vigyaniam
53. Anupana Manjari
