Syllabus for MD/MS (Ayurved) Preliminary Examination

5. RASA SHAASTRA AND BHAISHAJYA KALPANA
(latrochemistry & Pharmaceuticals Science)

PAPER-II

THEORY- 100 marks

PART–A

50 marks

01 Fundamental principles of Rasa Shastra and Bhaishajya Kalpana, introduction to Rasachikitsa, Ashuddha and Apakwa Bhasma- sevan Dosha and its management, introduction to Aushadha Sevan Kaal and Prayoga Marga (routes of administration).

02 Introduction to basic principles of Aushadha Yoga (formulations).

03 Classification of Rasa Dravya - concept and relevance.

04 Introduction to principles of Aushadha Nirmana, concept of Shodhan, Marana, Jarana, Murcchhana, Sattvapatan and Amritikarana.

05 Concept of Kashaya, Panchavidha Kashaya and other Kalpana.

06 Concept of Rasashala, Rasa Mandapa with introduction to pharmacy in accordance with the Good Manufacturing Practices (GMP).

07 Critical study of Rasa Ratnasamuchchaya, Rasendra Chintamani, Rasa Tarangini, Sharngadhara Samhita, Chakradutta and Bharat Bhaishajya Ratnakara with special reference to Aushadha-Nirmana.

PART–B

50 marks

01 Introduction to methods of analytical, toxicity, experimental and clinical validation of classical and proprietary Ayurvedic formulations.

02 Introduction to new dosage forms.

03 Introduction to advance instruments of analysis like XRD, XRF, SEM-E-Dax, ICP analysis, Chromatography: TLC, gas chromatography, HPTLC, concept of Nanotechnology and its relevance to Aushadha-Nirmana.

04 Concept of Pharmacopoeia and Formulary with introduction of ‘The Ayurvedic Pharmacopoeia of India’ (API) and ‘The Ayurvedic Formulary of India’ (AFI).

05 Introduction to databases of medicinal plants published by CCRAS, ICMR and others.

PRACTICAL

100 marks
Contents:
01 Shodhan, Marana, Amritikarana of Rasa Dravya (10 practicals)
02 Preparation of different dosage forms (10 forms)
03 Pharmacopoeial standards of raw and prepared drugs (20 practicals)

Raw Materials
1. Minerals and Metals
   Mineralogical Identification
   01 Physical form - Crystal and Amorphous
   02 Hardness on Moh’s scale
   03 Brittleness test
   04 Fracture and Cleavage
   05 Streak test
   06 Luster

2. Plant Material
   Macroscopic and Microscopic examination
   a. Orgnaoleptic testing
   b. Estimation of Foreign materials
   c. Microbial load
   d. Moisture content
   e. Determination of ash value - total, water soluble and acid Insoluble ash
   f. Specific gravity
   g. Solubility- water and alcohol
   h. Extract values- water and alcohol
   i. TLC
   j. Determination of optical density
   k. Refractive index
   l. Aflatoxins
   m. Limit tests for heavy metals
   n. pH estimation

Prepared dosage forms:
01 Solid dosage forms
   Rasaushadhi
   a) Bhasma and Pishti Pariksha
   b) Determination of Particle size
   c) Limit tests for heavy metals
   d) Determination of moisture content, specific gravity, pH and acid value.
   Kasthaushadhi
   a. Powders (Churna)
01 Particle size
02 Bulk density
Solubility
Estimation of Foreign material
Microbial load
Moisture content
Determination of ash value - total, water soluble and acid insoluble ash
Solubility - water and alcohol
Extract values - water and alcohol
TLC
Determination of Optical density
Refractive Index
Aflatoxins
Limit tests for Heavy metals
pH Value estimation

b. Tablets
Uniformity in weight and size
Tablet hardness
Tablet friability
Tablet disintegration
Tablet dissolution
c. Semisolid dosage forms
a. Moisture content
b. Sugar content
c. Microbial load

2. Plant Material
   Macroscopic and Microscopic examination
   a. Orgnaoleptic testing
   b. Estimation of Foreign materials
   c. Microbial load
   d. Moisture content
   e. Determination of ash value - total, water soluble and acid Insoluble ash
   f. Specific gravity
   g. Solubility - water and alcohol
   h. Extract values - water and alcohol
   i. TLC
   j. Determination of optical density
   k. Refractive index
   l. Aflatoxins
Limit tests for heavy metals
pH estimation

**Prepared dosage forms:**

1. **Solid dosage forms**
   
   **Rasaushadhi**
   
   a) Bhasma and Pishti Pariksha
   b) Determination of Particle size
   c) Limit tests for heavy metals
   d) Determination of moisture content, specific gravity, pH and acid value.

   **Kasthaushadhi**
   
   a. **Powders (Churna)**
   
   01 Particle size
   02 Bulk density
   03 Solubility
   04 Estimation of Foreign material
   05 Microbial load
   06 Moisture content
   07 Determination of ash value - total, water soluble and acid insoluble ash
   08 Solubility - water and alcohol
   09 Extract values - water and alcohol
   10 TLC
   11 Determination of Optical density
   12 Refractive Index
   13 Aflatoxins
   14 Limit tests for Heavy metals
   15 pH Value estimation

   b. **Tablets**
   
   01 Uniformity in weight and size
   02 Tablet hardness
   03 Tablet friability
   04 Tablet disintegration
   05 Tablet dissolution

   c. **Semisolid dosage forms**
   
   a. Moisture content
   b. Sugar content
   c. Microbial load
   
   d. **Liquids** pH value

   - Specific gravity
   - Determination of refractive index
- Acid value
- Viscosity
- Saponification value
- Iodine value

**Note:**
- All practicals should be performed in accordance with Authoritative Text Books of Schedule-I of D.C.Act-1940.
- All practicals related to Pharmacopoeial Standards should be performed in accordance with Methods Published in Protocol for testing of ASU Medicines and Laboratory Guidelines for the Analysis of Ayurveda & Siddha Formulations published by Deptt. of AYUSH, Government of India.

**Distribution of marks (Practical):**

<table>
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<tr>
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<th>Nature of Questions</th>
<th>Division of Marks</th>
<th>Total Marks</th>
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<tr>
<td>01</td>
<td>Practical Record Book</td>
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<tr>
<td>02</td>
<td><strong>Practicals related to Preparation of Drugs</strong></td>
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<td>B. Minor practical- one</td>
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<td>10 Marks</td>
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<tr>
<td>03</td>
<td><strong>Drug analysis</strong></td>
<td></td>
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<tr>
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<td>A. Major practical- one</td>
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<td>B. Minor practical- one</td>
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<td>04</td>
<td>Spotting</td>
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<td>05</td>
<td>Viva-voce</td>
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**Format of Question Paper**

### PART - A

<table>
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<td>S.A.Q. Attempt any 4 out of 5</td>
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**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. Bharat Bhaishajya Ratnakara
18. Rasayoga Sagara
19. Siddha Bhaishajya Manimala
20. Sahasrayoga
21. Siddha Yoga Sangraha – Yadavaji Trikamji Acharya
22. Vaidyaka Paribhasha Pradeepa

23. Ayurvediya Aushadhi Karana – Puranik and Dhamanakar
24. Dravyaguna Vijnan Part - 1 and 2 - Yadavji Trikamji
25. Chakradatta - Ratnaprabha, Relevant Parts from Charaka Samhita, Sushruta Samhita, Kashyapa Samhita, Ashtanga Sangraha, Ashtanga Hridaya,
26. Remington: Science and Practice of Pharmacy
27. Theory and Practice of Industrial Pharmacy – Leon Lachman et al
28. Clinical Pharmacology, KD Tripathi
29. Clinical Pharmacology, Lawrence Benette
30. Drug Discovery and Evaluation (Pharmacological assays) HG Vogel
31. Pharmacological Basis of therapeutics – Goodman and Gilman
32. Data Base of Medicinal Plants of CCRAS
33. Quality and Standards of Medicinal Plants – ICMR publication
34. Quality Control of Ayurvedic Drugs – PLIM, Gaziabad
35. Ayurvedic Pharmacopeia of India
36. Ayurvedic Formulary of India
37. Indian Pharmacopeia
38. British Pharmacopeia
39. United States Pharmacopeia
40. Pharmacopeia Codex
41. Current Good Manufacturing Practices
42. Drugs and Cosmetic Act 1940 and Rules 1945 with latest amendments
43. Drugs and Magic remedies (Objectionable advertisement) Act-1954
44. Prevention of Food Adulteration (PFA) act
45. Laws pertaining to Narcotics
46. Factory and Pharmacy Acts
47. Consumer Protection Act -1986
48. Brief information on the peer reviewed journals, official websites and other official search engines along with their links (related with the subject)
49. Rutleys Elements of Mineralogy
50. Bhasma Vigyaniyam
51. Kupipakva Vigyaniyam
52. Anupana Manjari