

B. PHARMA- V SEMESTER

Rajiv Gandhi Proudyogiki Vihswavidyalay, Bhopal (M.P.)

PHARMACEUTICS- VI PY-501(COSMETIC TECHNOLOGY)

Fundamental of cosmetic science. Structure and functions of skin and hair. Formulation considerations, preparation, packaging and evaluation of the following categories of cosmetics-

Face Preparation: Face powder, Compact powder, Talcum powder, Face packs and Masks.

Skin Preparation: Skin creams, Anti-wrinkle preparations, Barrier materials, Protective creams and gels, Vanishing creams, Cold creams, Cleansing creams, all purpose creams, emollient, Anti-perspirant,/ deodorant, Moisturising and foundation formulation. Bleaching creams, Night and Massage creams, Hand creams, Protective skin tonics, Skin moisturizers, Sun-screen, Suntan, and anti-sun burn preparation.

Shaving Preparation: Lather shaving stick, Lather shaving creams, Shaving foams, Shaving gels, Pre-and After shave lotions.

Shampoo and Bath preparations: Clear liquid shampoos. Aerosol shampoos, dry shampoos, Acid-balanced shampoos, Egg shampoos, Anti-dandruff Shampoos, Bath oils, Foam baths.

Hair Preparations: Hair tonics, Hair conditioners, Hair lotions, Hair sprays, Hair dressings, Hair setting lotions and creams, Hair dyes, Bleaches, Hair waving, Hair straightners and Hair strengthners.

Dentrifice: Tooth powders, Tooth pastes, Denture cleansers.

Foot Preparation: Foot powders, Foot sprays, Foot creams, Corn preparations and Athlete's foot preparation.

Manicure Preparation: Nail polish, Nail lacquers and Nail bleaches.

Herbal Cosmetics: Cosmetics containing Aloe, Babul, Brahmi, Chandan, Cucumber, Haldi, Jatamansi, Khus, Mehendi, Neem, Reetha, Shikakai, Tulsi, Arnica, Bhringraj and Volatile oils .

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Cosmetic for babies.

Colored make-up preparations: Lipsticks, Rouge, Mascara, Eye make-up, Eye-liner, Eyebrow pencils.

LIST OF PRACTICALS:

1. Prepare, Pack and Evaluate Compact Powder.
2. Prepare and Pack Face Mask.
3. Prepare and Evaluate Talcum Powder.
4. Prepare and Evaluate Vanishing Cream.
5. Prepare and Evaluate Cold Cream.
6. Prepare and Evaluate Cleansing Cream.
7. Prepare and Evaluate Emollient Cream.
8. Prepare and Evaluate Sunscreen preparation.
9. Prepare and Evaluate After shave lotion.
10. Prepare and Evaluate Lather shaving cream.
11. Prepare and Evaluate Simple shampoo (Soap based).
12. Prepare and Evaluate Acid balanced shampoo.
13. Prepare and Evaluate Egg shampoo.
14. Prepare and Evaluate Anti-dandruff Shampoo.
15. Prepare and Evaluate Hair conditioner.
16. Prepare and Evaluate Tooth Powder.
17. Prepare and Evaluate Tooth Paste.
18. Prepare, Pack and Evaluate Lipsticks.
19. Prepare, Pack and Evaluate Nail lacquer.
20. Prepare and submit Herbal preparations. (Atleast 5 different types)

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BOOKS RECOMMENDED:

1. M. S. Balsam & Edward Sagarin (Eds.), Cosmetic Science and Technology, Vol. 1-3, Krieger Publishing company. Florida.
2. Mac Chesney, J. C., Packaging of Cosmetic an Toiletries, Newness- Butterworth, London.
3. E.G., Thomssen, Modern Cosmetics, Universal Publishing Corporation, Bombay.
4. Jellinek, J.S. Formulation and Functions of Cosmetics, John Willey & Sons, New York.
5. R. K . Nema, K. S. Rathode, B.K. Dubey, Text Book of Cosmetics, CBS- Publishers & distributors, New Delhi.
6. Sunil Nanda, Arun Nanda & R.K. Khar, Cosmetic Technology, Birla publications Pvt. Ltd., Delhi.
7. B. M. Mithal and R.N. Saha, A handbook of cosmetics, Vallabh Prakashan, Delhi.
8. P.P. Sharma, Cosmetics- Formulation, Manufacturing & Quality control, Vandana Publications Pvt. Ltd, Delhi.
9. Hildo Butler (Ed.), Poucher's Perfumes, Cosmetics & Soaps, Kluwer Academic Publishers, The Netherland.
10. S.C. Bhata, Perfumes, soaps, Detergents and Cosmetics Vol. 1 & 2, CBS Publishers and Distributors, New Delhi.
11. Drug and Cosmetics Act & Rules.

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PHARMACEUTICS- VII PY-502 (DISPENSING, COMMUNITY AND HOSPITAL PHARMACY)

Dispensing Pharmacy:

Prescription, Handling of prescription, Sources of errors in prescription, Care required in dispensing prescriptions. Brief introduction of commonly used Latin terms in prescription.

General Dispensing Procedures including labeling of dispensed products.

Principles involved and procedures adopted in dispensing of typical prescriptions- Powders, Solutions, Mixtures, Emulsions, Lotions & Liniments.

Physical, Chemical and Therapeutic incompatibilities, Incompatibility of common occurrence and their correction.

Basis of posology, Detection of over doses in prescription, knowledge of prophylactic and therapeutic doses with route of administration.

Community Pharmacy:

Organisation and structure of retail and wholesale drug stores, Legal requirements for establishment and maintenance. Dispensing of proprietary products, Maintenance of records of retail and wholesaler, Patient counseling, Role of Pharmacist in community health care and education, Hazards of medication.

A brief study of proprietary products available in the market belonging to Chemotherapeutics, Vitamins, Anti-histaminics, expectorants and NSAID'S category.

Hospital Pharmacy:

Organization and structure: Organization of a hospital pharmacy, responsibilities of a hospital pharmacist, pharmacy and therapeutic committee.

Hospital Formulary: Contents, preparation and revision of hospital formulary.

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LIST OF PRACTICALS:

1. Prepare and Dispense Simple Powder.
2. Prepare and Dispense Compound Powder.
3. Prepare and Dispense Powder containing small doses.
4. Prepare and Dispense Powder containing liquids.
5. Prepare and Dispense Powder containing liquefiable substances.
6. Prepare and Dispense Powder containing hygroscopic and deliquescent substances.
7. Prepare and Dispense Powder containing efflorescent materials.
8. Prepare and Dispense effervescent granules.
9. Prepare and Dispense Dusting Powder.
10. Prepare and Dispense Simple Mixture containing Soluble substances only.
11. Prepare and Dispense Mixture containing Diffusible solids.
12. Prepare and Dispense Mixture containing Indiffusible solids.
13. Prepare and Dispense Mixture containing Precipitate forming liquids.
14. Prepare and Dispense Mixture containing Slightly soluble liquids.
15. Prepare and Dispense Mixture containing Small doses of potent medicaments.
16. Prepare and Dispense prescription possessing Physical Incompability (Incomplete Solution).
17. Prepare and Dispense prescription possessing Physical Incompability (Precipitation).
18. Prepare and Dispense prescription possessing Physical Incompability (Separation of immiscible liquids).
19. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with alkaline substances).
20. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with soluble iodides).
21. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with salicylates).
22. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with benzoates).

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23. Prepare and Dispense prescription possessing Chemical Incompability (Soluble salicylates with acids-Tolerated Incompatability).
24. Prepare and Dispense prescription possessing Chemical Incompability (Soluble salicylates with acids-Adjust Incompatability).
25. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with acids-Tolerated Incompatability).
26. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with acids-Adjusted Incompatability).
27. Prepare and Dispense prescription possessing Chemical Incompability (Soluble salicylates with ferric salts).
28. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with ferric salts).
29. Prepare and Dispense prescription possessing Chemical Incompability (Evolution of carbon dioxide).
30. Prepare and Dispense prescription possessing Chemical Incompability of emulsifying agents.
31. Prepare and Dispense Emulsion containing Volatile oils.
32. Prepare and Dispense Emulsion containing Fixed oils.
33. Prepare and Dispense Emulsion containing Oleoresins.
34. Prepare and Dispense Calamine lotion.
35. Prepare and Dispense turpentine liniment.

BOOKS RECOMMENDED:

1. Allwodd M. C. and Fell J. T., Text book of Hospital Pharmacy, Blackwell Scientific Publication, Oxford.
2. Hassan W. E., Lea and Febiger, Philadelphia Hospital Pharmacy.
3. J.S. Qadry, R.K. Goyal & R.K. Parika, Merchant & Qadry's a text book of Hospital Pharmacy, B.S. Shah Prakashan, Ahmedabad.
4. Pratibha Nand & R.K. Khar, Text Book of Hospital & Clinical Pharmacy, Birla Publications Pvt Ltd., Delhi.

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5. S.J. Carter (Ed.), Cooper & Gunn's Dispensing for Pharmaceutical Students, CBS Publishers & Distributors, New Delhi.
6. R.M. Mehta, Dispensing Pharmacy, Vallabh Prakashan, Delhi.
7. S.N. Sharma & N.K. Jain, the Concise Pharmaceutical Dispensing, Prakash B. Printers, Baroda.
8. N.K. Jain & G.D. Gupta, Modern Dispensing Pharmacy, PharmaMed Press, Hyderabad.
9. E.W. Martin, Dispensing of Medications (Formerly Husa's Pharmaceutical Dispensing) Mack Publishing Company, Eastern Pa.

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PHARMACEUTICAL CHEMISTRY -VI PY-503 (MEDICINAL CHEMISTRY- I)

Introduction to medicinal chemistry

- Principles of drug discovery: Basic principles of medicinal chemistry, physicochemical and steric aspects (optical, geometric and bioisosterism) of drug molecules and biological actions.
- Receptors and drug action: Receptor theories, affinity, receptor and biologic response.
- Drug metabolism: Phase I (biotransformation reactions), phase II (conjugation reactions), factor affecting drug metabolism.
- Prodrugs and drug latentiation: Basic concepts, prodrug of functional groups, bioprecursor prodrugs, chemical delivery system.

Classification and mode of action, uses, structure activity relationship including physicochemical, steric aspects and resents advances in research of the following categories of drugs:

- **Drugs affecting neurotransmission**
 - Drugs affecting cholinergic neurotransmission: Neurochemistry and stereochemistry of acetylcholine, acetylcholine mimetics-muscarinic agonists, acetylcholinesterase inhibitors, acetylcholine antagonists-muscarinic anatagonists, nicotinc antagonists-neuromuscular blocking agents, ganglionic blocking agents.
 - Drugs affecting adrenergic neurotransmission: Neurochemistry and stereochemistry of norepinephrine, sympathomimetic agents, sympatholytic agents, drugs affecting catecholamine biosynthesis, drugs affecting catecholamine storage and release, ergot alkaloids, xanthine bronchodilators
 - Drugs affecting serotonergic neurotransmission: Neurochemistry and stereochemistry of serotonin, 5-HT agonists, 5-HT antagonists.
 - Local anesthetics: Molecular mechanism of action, chemical aspects.
- **Drugs affecting immune systems**
 - Non-steroidal anti-inflammatory agents: Chemistry of chemical mediators of inflammation (prostaglandins, thromboxanes, prostacyclin and leukotrienes), antipyretic analgesics.
 - Antihistaminics and related antiallergics: Neurochemistry and stereochemistry of histamine, inhibitor of histamine release (mast cell stabilizers), inhibitors of released histamine, dual acting antihistaminics; H₂ antagonists, H₃ antagonists.

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LIST OF PRACTICALS:

(Minimum fifteen experiments should be performed in the semester. Student should aware with safety parameters and handling of chemicals related to following experiments)

1. Synthesis and characteriazation of Tropenone from Maleyde aldehyde.
2. Synthesis and characteriazation of Scopolamine from Tropenol.
3. Synthesis and characterization of chlorzoxazone from 2-amino-4-chlorphenol.
4. Synthesis and characterization of Clemastine.
5. Synthesis and characterization of Tripeleennamine.
6. Synthesis and characterization of Oxyphenbutazone.
7. Synthesis and characterization of trihexyl phenylidine.
8. Synthesis and characterization of Aspirin from salicylic acid.
9. Synthesis and characterization of Benzimidazole from benzyl chloride.
10. Synthesis and characterization of Sulphonilamide from Aniline.
11. Synthesis and characterization of Paracetamol from Para amino phenol.
12. Synthesis and characterization of Ibuprofen from isobutyl benzene.
13. Synthesis and characterization of Antipyrine
14. Synthesis and characterization of Phenyl benzoate.
15. Synthesis and characterization of Benzenilide.
16. Synthesis and characterization of Phenindione.
17. Synthesis and characterization of Methyl pyrazolone.

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BOOKS RECOMMENDED:

1. Foye, W.C., Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia.
2. Wolff , M.E. Ed., Burger's Medicinal Chemistry, John Wiley and Sons, New York.
3. Hansch, C., Comprehensive Medicinal Chemistry, Pergarnon Press, Oxford.
4. Delagado, J.N. and Remers, W.A.R, Wilson and Giswold's Text Book of Organic, Medicinal and Pharmaceutical Chemistry, J.Lippincott Co., Philadelphia.
5. Nogrady, T., Medicinal Chemistry-A Biochemical Approach, Oxford University Press, New York, Oxford.
6. Kar, A., Medicinal Chemistry, Willey Eastern Ltd., New Delhi.
7. Patrick, G., An Introduction to Medicinal Chemistry, Scientific Distributors, Mumbai.
8. Malone, Dyson and Purey, May's Chemistry of Synthetic Drugs.
9. Parimoo, P., Text Book of Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
10. Thomas, G., Introduction to Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.

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PHARMACOGNOSY -III PY-504

General techniques of biosynthetic studies and basic metabolic pathways. Introduction to biosynthesis of secondary metabolites of pharmaceutical importance. A brief introduction of chemical nature of phytoconstituents.

Radio – tracer techniques and utilization in biogenetic studies.

Phytochemical Screening: Preparation of extracts and different tests performed for screening of extracts for the presence of alkaloids, saponins, steroidal compounds, flavanoids, anthraquinones, phenolics, amino acids, carbohydrates, fats etc.

Concepts of stereoisomerisms Nature, distribution, classification, general methods of isolation and properties of alkaloids and terpenoids.

Chemistry, biogenesis and pharmacological activity of atropine, reserpine, ephedrine, ergometrine, strychnine, quinine, morphine, digitoxin, sennosides, diosgenin, sarsapogenin, menthol, citral, taxol, rutin and artemisine.

Systematic pharmacognostical study of alkaloidal drugs like; Tobacco, Belladonna, Hyoscyamus, Datura, Coca, Withania, Cinchona, Ipecac, Opium, Ergot, Rauwolfia, Vinca, Nuxvomica, Physostigma, Pilocarpus, Veretrum, Kurchi, Ephedra, Solanum, Tea, Colchicum, coffeae, aconite etc.

LIST OF PRACTICALS:

1. Identify Colchicum, Ipecac and Vinca leaves morphologically.
2. Identify Aconite, Hyoscyamus and Withania leaves morphologically.
3. Perform morphological, microscopic and chemical evaluation of Tobacco.
4. Perform morphological, microscopic and chemical evaluation of Withania.
5. Perform morphological, microscopic and chemical evaluation of Cinchona bark.
6. Perform morphological, microscopic and chemical evaluation of Rauwolfia root.
7. Perform morphological, microscopic and chemical evaluation of Nux vomica seeds.

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8. Perform morphological, microscopic and chemical evaluation of Ephedra.
9. Perform morphological, microscopic and chemical evaluation of Kurchi bark.
10. Isolate Nicotine from tobacco.
11. Isolate Caffeine from tea leaves.
12. Isolate Quinine from cinchona.
13. Isolate alkaloids from nux vomica seeds.
14. Isolate starch from potatoes.
15. Perform morphological characterization like type of stomata and calculate the stomatal index, vein islets, vein termination numbers, microscopic and chemical evaluation of Datura leaves.
16. To identify and evaluate the given sample of Colchicum corm by morphological, microscopical and chemical evaluation.
17. To identify the given sample of powdered crude drug by various phytochemical tests.
(Cinchona/Rauwolfia/Senna/Ephedra)

BOOKS RECOMMENDED

1. Trease, G.E. and Evans, W.C., Pharmacognosy, Bailliere Tindall, Eastbourne, U.K.
2. Tayler, V.C., Brady, L.R. and Robers, J.E., Pharmacognosy, Lea and Febiger, Philadelphia.
3. Shah, C.S. and Quadry, J.S., A text book of Pharmacognosy, B.S. Shah Publishers, Ahmedabad.
4. Kokate, C.K., Purohit, A.P. and Gokhale, S.B., Pharmacognosy, Nirali Prakashan, Pune.
5. Indian Pharmacopoeia, Ministry of Health and Family Welfare, Govt. of India, New Delhi.
Wallis, T.E., Text Book of Pharmacognosy, Jand A Churchill Limited, London

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PHARMACOLOGY-II PY-505

Pathophysiology of CNS diseases and pharmacology of drugs used to treat them

- 1) Neurohumoral transmission in CNS
 - a. Cholinergic pathways
 - b. Dopaminergic pathway
 - c. Serotonergic pathways
 - d. Noradrenergic pathways
- 2) General anesthetics
- 3) Hypnotics, sedatives, antianxiety agents, and centrally acting muscle relaxants.
- 4) Psychopharmacological agents
 - a. Antipsychotics
 - b. Antidepressants
 - c. Antimaniacs
 - d. Hallucinogens
- 5) Anti-epileptic drugs
- 6) Narcotic analgesics and antagonist
- 7) Drugs used in neurodegenerative diseases
 - a. Parkinson's Disease
 - b. Alzheimer's Disease
- 8) Drug addiction and drug abuse
 - a. Alcohol
 - b. Nicotine
 - c. Cannabis
- 9) CNS stimulants

Pharmacology of drugs acting on gastrointestinal tract

- 1) Antacids, antisecretory and antiulcer drugs
- 2) Emetics and antiemetics

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LIST OF PRACTICALS

- 1) Bioassay for acetylcholine/histamine using isolated organ preparations (rat ileum/rat duodenum/rat colon/rat fundus/guinea pig ileum/guinea pig tracheal chain preparation/goat ileum)
 - a) Matching bioassay or Bracketing bioassay
 - b) Interpolation bioassay or graphical bioassay
 - 2) Study the CNS depressants using cornea and pinna reflex test.
 - 3) Study CNS stimulants by evaluation of locomotor activity (Actophotometer)
 - 4) Study Central muscle relaxants using Rota rod apparatus
 - 5) Study lenticular opacity produced by opioid analgesics in rodents.
 - 6) Study anticonvulsant effect of some drugs using maximum electroshock method and chemical-induced convulsion method.
 - 7) Study antianxiety effect of some drugs using elevated plus maze test or social interaction test or novelty suppressed feeding test in rodents.
 - 8) Evaluate hypnotic activity of a drug by employing potentiation of thiopental induced sleeping time paradigm.
 - 9) Study antipsychotic effect of some drugs using catalepsy test or inhibition of amphetamine stereotypy in rodents.
- Study intravenous anesthetics using righting reflex test.

BOOKS RECOMMENDED

- 1) Herfindal, E.T., Gourley, D.R., (eds.) (2000) Textbook of therapeutics Drug and disease management. 7th ed. Baltimore: Lippincott Williams and Wilkins
- 2) Hardmen, J.G., Limbird, L.E., Gilman A.,G., (eds.) (2001) Goodman and Gilman's The pharmacological basis of therapeutics. 10th ed. USA: The McGraw Hill Companies
- 3) Kumar, V., Abbas, A.K., Fausto, N., (eds.) (2004) Robbins and Cotran Pathologic basis of disease. 7th ed. Pennsylvania: Saunders

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- 4) Barar, F.S.K., (2000) Essentials of therapeutics. New Delhi: S. Chand and Company (P) Ltd.
- 5) Satoskar, R.S., Bhandarkar, S.D., Rege, N.N., (2007) Pharmacology and Pharmacotherapeutics. 12th ed. Mumbai: Popular Prakashan
- 6) Seth, S.D., (ed.) (2005) Textbook of Pharmacology. 2nd ed. New Delhi. Elsevier
- 7) Tripathi, K.D. (1999) Essentials of medical pharmacology. 4th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.
- 8) Mycek M.J., Haney, R.A., Champe, P.C. (2000) Lippincott's illustrated reviews: Pharmacology. 2nd ed. Baltimore: Lippincott Williams and Wilkins.
- 9) Rang, H.P., et al. (eds.) (2003) Pharmacology. 5th ed. Philadelphia: Elsevier
- 10) Katzung, B.G., (2004) Basic and clinical pharmacology. 9th ed. USA: The McGraw Hil Companies.
- 11) McKim, W.A., (2006) Drugs and Behavior: An Introduction to Behavioral Pharmacology. London: Prentice Hall.