

# Practical Medicinal Chemistry I and III

Course Codes **BP406P** and **BP607P**

for **Fourth and Sixth Semesters Bachelor of Pharmacy**

covers the basic principles, reactions involved, experimental procedures and uses of drugs/organic compounds in each experiment for better understanding the process. This book also covers assay, identification of drugs. This book is written in easy language and in concise form to help pharmacy students. The important aspects involved in the practicals of medicinal chemistry have been comprehensively covered. These experiments are intended to train the students in the handling of chemicals and apparatus involved, besides enabling them to understand the intricacies, theoretical aspects and practical limitations of a known reaction.

The book is designed to meet the requirements of fourth and sixth semesters BPharmacy and final year DPharmacy students who would be greatly benefitted.

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Nema | Sahu

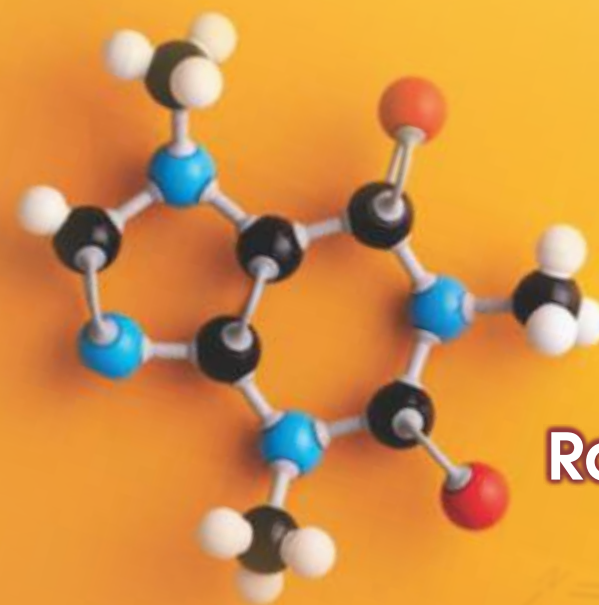


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As per the latest syllabus prescribed by  
Pharmacy Council of India for Bachelor of Pharmacy Course



**Rajesh Kumar Nema**  
**Anjali Sahu**



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**Practical Medicinal Chemistry I**  
Course Code: BP406P

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## Part II

### Practical Medicinal Chemistry III

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# Syllabus

**BPharm—Semester IV**  
**Course Code: BP406P**  
**PRACTICAL MEDICINAL CHEMISTRY I**  
**(Practical)**

4 hours/week

## **I. Preparation of drugs/intermediates**

1. 1,3-pyrazole
2. 1,3-oxazole
3. Benzimidazole
4. Benzotriazole
5. 2,3-diphenyl quinoxaline
6. Benzocaine
7. Phenytoin
8. Phenothiazine
9. Barbiturate

## **II. Assay of drugs**

1. Chlorpromazine
2. Phenobarbitone
3. Atropine
4. Ibuprofen
5. Aspirin
6. Furosemide

## **III. Determination of partition coefficient for any two drugs**

**BPharm—Semester VI**  
**Course Code: BP607P**  
**PRACTICAL MEDICINAL CHEMISTRY III**  
**(Practical)**

4 hours/week

## **I. Preparation of drugs and intermediates**

1. Sulphanilamide
2. 7-Hydroxy, 4-methyl coumarin
3. Chlorobutanol
4. Triphenyl imidazole
5. Tolbutamide
6. Hexamine

## **II. Assay of drugs**

1. Isonicotinic acid hydrazide
2. Chloroquine
3. Metronidazole

4. Dapsone
5. Chlorpheniramine maleate
6. Benzyl penicillin

**III. Preparation of medicinally important compounds or intermediates by microwave irradiation technique**

**IV. Drawing structures and reactions using chemDraw**

- V. Determination of physicochemical properties** such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

# Safety Instructions to the Students



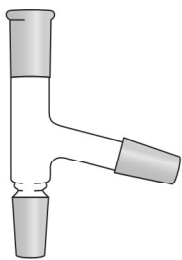
During working in various laboratories, students should be very careful in performing experiments and follow the appropriate safety procedures practiced in the clinical laboratory that understand proper laboratory safety and increase awareness of the possible risks/hazards involved with laboratory work and to realize that the laboratory is generally a safe place to work (if safety guidelines are properly followed). Here we list some of the most common lab safety rules out there, to help you.

- Always wear a full-length, long-sleeved laboratory coat (apron), should be worn buttoned and wear shoes while working in the laboratory.
- Use safety goggles when required.
- Do not keep your blazer and bags on the bench.
- Wear sensible clothing including footwear. Loose clothing should be secured so they do not get caught in a flame or chemicals.
- Do not use mobile phone in the laboratory.
- Do not eat/drink in the laboratory. Any type of food/chewing gum/gutkha/pan masala/tobacco/smoking are strictly prohibited in the laboratory.
- Always keep the working area tidy and clean.
- Know the standard operating procedures (SOP) of all instruments and follow all instructions given by the teacher.
- Handle all hazardous material safely by following universal precautions at all times.
- All chemicals in the laboratory are to be considered dangerous. Do not taste/sniff chemicals/smell any chemical unnecessarily.
- Never mix the chemicals unless it is required in the experiment. Do not bring the reagent bottle to your seat.
- Use properly cleaned pipettes, droppers and spatulas to take out reagents and solutions.
- Toxic and corrosive materials (acids and alkali) are used frequently. They must be handled with extreme care. Always add acid slowly to water.
- Sodium hydroxide, phenol and bromine are corrosive and can cause serious burns. Use great care to avoid contact with skin, eyes and clothing. In case of accident wash the affected area with plenty of cold water.



- Do not pipette concentrated acids by mouth. Mechanical pipetting devices must be used for pipetting all liquids.
- Use dilute acids or alkaline solutions if concentration is not specified.
- Always use volatile chemicals, strong acid and bases, under ventilating hood. Keep away from flames.
- Many organic solvents are flammable and toxic, e.g. acetone, alcohols and ethers are toxic, so never heat on direct flame. Hot water bath is used. Do not allow any solvent to come into contact with your skin.
- Many organic substances are hazardous to health, so avoid breathing toxic vapors. Before removing any of the contents from a chemical bottle, read the label twice.
- All chemicals should always be clearly labeled with the name of the substance, its concentration, date of preparation.
- Always use weighing bottle/watch glass/butter paper for weighing of chemicals.
- Do not leave lit bunsen burners unattended.
- Open doors and windows and keep the exhaust fan on while working in the laboratory.
- Turn off all electricity switches, heating apparatus, gas valves and water faucets when not in use.
- Open flames/transfer of flame should never be used in the laboratory. Turn off the gas at gas outlet valve after using.
- Use tongs or heat-protective gloves when holding/touching heated apparatus.
- Never point a test tube being heated at another student or yourself. Never look into a test tube while you are heating it.
- Keep solids out of the sink.
- Dispose of lab waste materials properly.
- Know the locations and operating procedures of all safety equipment.
- Know locations and operating procedures of all fire exits, fire extinguishers and fire alarms.
- Never lift any glassware, solutions, or other types of apparatus above eye level.
- Keep your hands dry when working with electricity. Do not use defect sockets, plugs, switches or any other defective pieces of equipment.
- Use glassware with care, used glassware must be cleaned and dried after completion of practical.
- Before leaving the lab, clean all pieces of equipment, glassware and the work area which you have been using. Return equipment and glassware to their proper places in the laboratory.
- Check all electrical and gas devices are switched off before leaving the laboratory.
- Always wash your hands with soap and water before leaving the laboratory.
- Read procedures and precautions carefully and follow them.
- Do not perform unscheduled and unapproved experiments.
- Use common sense while working in the laboratories.

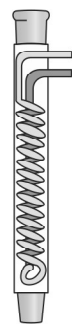
# Laboratory Equipment



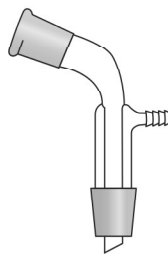
Short path distillation head



Vigreux distillation



Reflux condenser



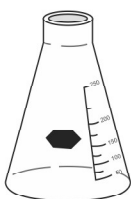
Distillation receiver



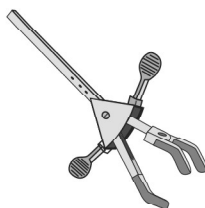
Graduated cylinder



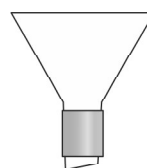
Three-necked round-bottom flask



Conical flask



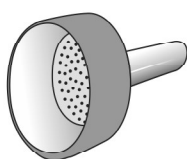
Prolonged clamp



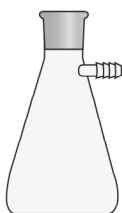
Solid addition funnel



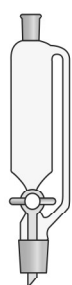
Separatory funnel



Buchner funnel



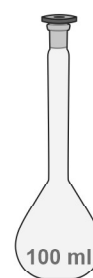
Filtration flask



Addition funnel



Condenser



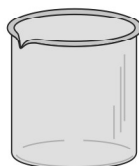
Volumetric flask



Cold finger



Desiccator



Beaker



Sintered glass funnel



Distillation thermometer



Clamp holder



Reducing joint adapter



Chromatography coloumn



TLC developing tank



Round bottom flask



Ring clamp



Rings/clamps stand



Hot plate stirrer



Kick clips



Stir bars

## Chemical Hazard Symbols



**Acute toxic:** It indicates life-threatening effects, in some cases even after limited exposure. Any form of ingestion and skin contact should be avoided. These products can cause death or serious illness when small amounts enter the body by ingestion, inhalation of vapor, fumes or dust, or by absorption through the skin; hygiene considerations should be rigorously observed.



**Moderate hazard:** May irritate the skin or exhibit minor toxicity. The chemical should be kept away from the skin and the eyes as a precaution. Irritant chemicals cause inflammation of the skin, mucous membranes, or discomfort of the respiratory system. All laboratory chemicals should be regarded as harmful; some are specifically harmful by skin contact, inhalation or swallowing.



**Oxidising:** Burns even in the absence of air and can intensify fires in combustible materials. Should be kept away from ignition sources. These compounds may cause fire and will always assist combustion. They produce heat on contact with organic matter and reducing agents.



**Explosive:** May explode as a consequence of fire, heat, or friction. Chemicals with this label should be kept away from potential ignition sources. Some compounds form sensitive explosive salts on contact with metals.



**Flammable:** Flammable when exposed to heat, fire or sparks or give off flammable gases when reacting with water. Ignition sources should be avoided.



**Corrosive:** May cause burns to skin and damage to eyes. May also corrode metals. Avoid skin and eye contact, and do not breathe vapours. Emergency showers should be available. If swallowed, plenty of water should be given after immediate mouth rinsing.



**Health hazard:** Short- or long-term exposure could cause serious long-term health effects. Skin contact and ingestion of this chemical should be avoided.



**Gas under pressure:** Container contains pressurized gas. This may be cold when released, and explosive when heated. Containers should not be heated.



**Environmental hazard:** Indicates substances that are toxic to aquatic organisms or may cause long lasting environmental effects. They should be disposed of responsibly.