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GENERAL PHARMACY

(STRICTLY ACCORDING TO SYLLABUS APPROVED BY PCI FOR B.PHARM COURSE)

For B.PHARM
Ist Sem

SHREE SAI PRAKASHAN

UNIT I

Introduction to the Profession of Pharmacy

History of the Profession of Pharmacy in India

The profession of pharmacy in India has evolved gradually from traditional systems of medicine to a highly scientific, regulated healthcare profession. In ancient India, medicines were mainly prepared and dispensed by practitioners of Ayurveda, Siddha, and Unani systems. Herbal drugs derived from plants, minerals, and animals were used to treat diseases. During that period, there was no separate profession called pharmacy because physicians themselves prepared and supplied medicines. With the arrival of British rule, Western, or allopathic, medicine entered India, leading to the establishment of modern pharmaceutical practices. Initially, medicines were imported from abroad, especially from Britain, and pharmacists mainly worked as compounders, preparing prescriptions under physician's supervision. The development of pharmacy education in India began in the early twentieth century when the need for trained pharmaceutical professionals was recognized. A major milestone was the establishment of the Department of Pharmaceutics at Banaras Hindu University under the leadership of Prof. M. L. Schroff, who is regarded as the father of pharmacy education in India. In 1937, he initiated systematic pharmacy education, laying the foundation for professional pharmacy courses across the country.

Professionalization of Pharmacy After Independence

1. Pharmacy Act, 1948

One of the most important milestones in the history of Indian pharmacy was the enactment of the Pharmacy Act, 1948. The Act was introduced to regulate the profession and practice of pharmacy throughout India.

Objectives

- Regulate pharmacy education.
- Establish standards for professional practice.
- Register qualified pharmacists.
- Prevent unqualified persons from practicing pharmacy.
- Protect public health.

2. Establishment of the Pharmacy Council of India (PCI)

The Pharmacy Council of India was constituted in 1949 under the Pharmacy Act, 1948. It regulates pharmacy education and professional standards in India.

Functions of PCI

- Prescribing minimum educational standards.
- Approving pharmacy institutions.
- Framing education regulations.
- Maintaining professional standards.
- Regulating pharmacy practice.

3. Growth of Pharmacy Education

(a) Diploma in Pharmacy (D.Pharm) : Initially, D.Pharm became the minimum qualification for registration as a pharmacist.

Role :

Community pharmacy practice.

- Hospital dispensing.
- Drug distribution services.

(b) Bachelor of Pharmacy (B.Pharm) : The B.Pharm program expanded pharmaceutical education.Graduates found employment in:

- Pharmaceutical industries
- Quality control laboratories
- Research organizations
- Drug regulatory agencies

(c) Master of Pharmacy (M.Pharm) and PhD program : Two-year M.Pharm programs were introduced to develop specialization in various fields such as Pharmaceutics, Pharmacology, Pharmaceutical Chemistry, Pharmacognosy, Pharmaceutical Analysis, and Industrial Pharmacy.

The PhD program was introduced in India in 2008 to strengthen patient-oriented pharmacy services.

4. Development of the Indian Pharmaceutical Industry

The growth of the pharmacy profession is closely linked to that of the Indian pharmaceutical industry.

(a) Pre-1970 Era

- Dominated by multinational companies.
- Heavy dependence on imported medicines.
- Limited indigenous production.

(b) Post-1970 Era

The Indian Patent Act, 1970, encouraged domestic pharmaceutical manufacturing.

Outcomes

- Growth of Indian pharmaceutical companies.
- Development of generic medicines.
- Expansion of pharmaceutical exports.
- Increased employment opportunities for pharmacists.

(c) Global Recognition

Today, India is recognized as:

- "Pharmacy of the World"
- One of the largest producers of generic medicines.
- A major supplier of vaccines globally.
- An important center for pharmaceutical research and manufacturing.

Scope of the Pharmacy Profession

Role and Responsibilities of Pharmacists in Retail or Community Pharmacy

- Community pharmacy, also known as retail pharmacy, is the most visible branch of the pharmacy profession because pharmacists directly interact with the public.
- A community pharmacist is responsible for dispensing medicines in accordance with prescriptions issued by registered medical practitioners.
- The pharmacist ensures that the correct medicine, dose, dosage form, and quantity are supplied to the patient. This responsibility is extremely important because any dispensing error can pose serious health risks.
- Pharmacists also counsel patients regarding the proper use of medicines, dosage schedules, storage conditions, possible side effects, drug interactions, and precautions. Proper counselling improves patient compliance and therapeutic outcomes.
- Community pharmacists also guide patients regarding the use of over-the-counter medicines for minor ailments such as fever, cough, cold, acidity, and pain. In addition, they monitor prescriptions for rational drug use and prevent misuse of habit-forming or narcotic drugs.
- Pharmacists participate in health awareness programs related to vaccination, diabetes, hypertension, smoking cessation, family planning, and infectious disease prevention.
- Pharmacists maintain records of prescriptions, especially for controlled drugs, according to legal requirements.

- Inventory management is another important responsibility because medicines must be stored under suitable conditions to maintain their potency and stability.
- Expired, damaged, or counterfeit medicines must be identified and removed from stock.

Thus, community pharmacists serve as an important link between doctors and patients and contribute directly to public health.

Role and responsibilities of Pharmacists in Hospital and Clinical Pharmacy

- Hospital pharmacists work in hospitals and other healthcare institutions, ensuring the safe and effective use of medicines for admitted patients.
- Their primary responsibility is to procure, store, prepare, and dispense medicines required in different hospital departments.
- Hospital pharmacists maintain adequate drug inventories and ensure that emergency medicines are always available.
- They also prepare sterile products such as injections, intravenous fluids, total parenteral nutrition, and cytotoxic preparations under aseptic conditions. Proper handling of sterile products is essential to prevent contamination and infection.
- Clinical pharmacy is an advanced branch of pharmacy in which pharmacists actively participate in patient care along with physicians and nurses.
- Clinical pharmacists review medication therapy to ensure the rational use of medicines and prevent medication-related problems such as adverse drug reactions, drug interactions, overdose, and therapeutic duplication.
- They monitor patient's responses to therapy and recommend treatment modifications when necessary.
- Pharmacists also participate in ward rounds, provide drug information to healthcare professionals, and educate patients regarding disease management and medication use.
- Therapeutic drug monitoring, pharmacovigilance, and patient counselling are important functions of clinical pharmacists. Their contributions improve treatment outcomes, reduce hospital stays, minimize medication errors, and enhance patient safety.

Role and responsibilities of Pharmacists in Industrial Pharmacy and Research & Development : Industrial pharmacy deals with the large-scale manufacture and quality assurance of pharmaceutical products.

- Pharmacists working in pharmaceutical industries are involved in formulation development, production, quality control, quality assurance, packaging, storage, marketing, and regulatory affairs.

- In manufacturing departments, pharmacists supervise the production of tablets, capsules, syrups, injections, ointments, and other dosage forms in accordance with Good Manufacturing Practices (GMP). Their role is important because medicines must be produced consistently with high quality, purity, safety, and efficacy.
- In quality control laboratories, pharmacists perform a range of chemical, physical, and microbiological tests on raw materials, intermediates, and finished products. Quality assurance pharmacists ensure that every manufacturing step follows regulatory standards and documentation requirements.
- Regulatory affairs professionals prepare documents required for obtaining approval from drug regulatory authorities.
- Pharmacists also work in pharmaceutical marketing, providing scientific information about medicines to healthcare professionals.
- Research and development (R&D) is another major area in industrial pharmacy. Pharmacists involved in R&D develop new drug formulations, improve existing dosage forms, conduct stability studies, and perform bioavailability and bioequivalence studies.
- They also participate in clinical research and drug discovery programs.
- The increasing demand for innovative medicines, biotechnology products, vaccines, and targeted drug delivery systems has greatly expanded the scope of pharmacy research.

Thus, industrial pharmacy contributes significantly to healthcare advancement and economic development.

Pharmacopoeias

A Pharmacopoeia is an authoritative publication that provides official standards and specifications for pharmaceutical substances and preparations.

It is an officially recognized book containing standards for the identity, purity, strength, quality, testing methods, storage conditions, labeling requirements, and specifications of drugs, pharmaceutical substances, and dosage forms. It acts as a legal and scientific reference for manufacturers, pharmacists, regulatory authorities, researchers, and healthcare professionals.

The primary purpose of a pharmacopoeia is to ensure that medicines available to patients are safe, effective, and of consistent quality. Compliance with pharmacopoeial standards is often mandatory under national drug laws.

Main Objectives

- To establish standards of drug quality.

- To ensure uniformity of medicines.
- To protect public health.
- To provide analytical methods for testing drugs.
- To prevent adulteration and substandard medicines.
- To facilitate international trade of pharmaceuticals.

I. Indian Pharmacopoeia (IP)

The Indian Pharmacopoeia (IP) is the official Pharmacopoeia of India. It prescribes standards for drugs manufactured, marketed, and used within the country.Publication of IP is carried out by the "Indian Pharmacopoeia Commission,"which functions under the Ministry of Health and Family Welfare.

Historical Development of the Indian Pharmacopoeia

Before Independence : India mainly reliedon the following for drug standards :

- British Pharmacopoeia (BP)
- British Pharmaceutical Codex (BPC)

After Independence : The need for an indigenous pharmacopoeia became essential because :

- India had unique medicinal plants.
- Local manufacturing increased.
- National drug standards were required.

Various editions of the Indian Pharmacopoeia

Year	Development
1948	The Indian Pharmacopoeia Committee constituted
1955	First edition of the Indian Pharmacopoeia was published
1966	Second edition
1985	Third edition
1996	Fourth edition
2007	Fifth edition
2010	Sixth edition
2014	Seventh edition
2018	Eighth edition
2022	Ninth edition

Features of the Indian Pharmacopoeia

1. Official Legal Document : The Indian Pharmacopoeia (IP) is the official legal standard for medicines in India. It provides mandatory quality requirements that pharmaceutical manufacturers and regulatory authorities must follow to ensure the safety and effectiveness of drugs.

2. Scientific Standards : The IP includes scientifically validated methods for drug testing, including identification, assay, impurity analysis, dissolution testing, and sterility testing. These standards help maintain the accuracy, reliability, and consistency of pharmaceutical products.

3. Regular Revision and Updating : To keep pace with advancements in pharmaceutical science, the Indian Pharmacopoeia is regularly revised. New drugs, modern analytical techniques, and updated quality standards are incorporated to ensure relevance and international compatibility.

4. Comprehensive Coverage : The IP covers a wide range of pharmaceutical products, including drug substances, dosage forms, excipients, vaccines, biological products, herbal medicines, and medical devices, making it a comprehensive reference for the pharmaceutical sector.

5. Protection of Public Health : A major objective of the Indian Pharmacopoeia is to safeguard public health by ensuring that medicines available to patients are safe, pure, effective, and of consistent quality. It helps prevent the circulation of substandard and adulterated drugs in the market.

Structure of the Indian Pharmacopoeia

The Indian Pharmacopoeia is systematically organized to facilitate easy reference.

Volume Arrangement

The IP generally contains multiple volumes comprising :

Volume I	Volume II and Subsequent Volumes
Preface Explains objectives and scope. **General Notices** Provides instructions applicable to all monographs. **General Chapters** Describes analytical procedures. **Reagents** Lists chemicals and reagents.	Contain individual monographs of: • Drug substances • Dosage forms • Excipients • Biological products • Vaccines • Herbal products

Contents of the Indian Pharmacopoeia

1. General Notices : These are mandatory instructions governing the interpretation of all monographs.

Includes

- Units of measurement
- Temperature definitions
- Weighing procedures
- Tolerance limits

2. General Chapters : Describe analytical techniques.

Examples

- Chromatography
- Spectroscopy
- Dissolution testing
- Sterility testing
- Microbial testing

3. Monographs : The most important section.

Each monograph provides standards for a specific drug.

4. Appendices : Contain supplementary information.

Examples

- Reagent preparation
- Volumetric solutions
- Reference standards

Study of a Model IP Monograph

Example : Paracetamol IP

A monograph provides complete quality specifications for a drug.

1. Title

- Paracetamol
- The official name of the drug.

2. Chemical Information

- **Chemical Name :** N-(4-hydroxyphenyl) acetamide
- **Molecular Formula :** $C_8H_9NO_2$
- **Molecular Weight :** 151.16
- **Purpose :** Provides scientific identification.

3. Description

- Describes physical appearance.

Example :

- White crystalline powder.
- Odourless.
- Slightly soluble in water.
- **Purpose :** Assists preliminary identification.

4. Identification Tests

Confirms the authenticity of the drug.

Methods may include:

- Infrared spectroscopy
- Chemical reactions
- UV absorption

Purpose : Ensures the correct substance is present.

5. Tests (Purity Tests)

Determines the absence of contaminants.

Includes

- Related substances
- Heavy metals
- Sulphated ash
- Loss on drying

Purpose : Ensures purity and safety.

6. Assay

Determines the amount of active ingredient present.

For Paracetamol:Typically required to contain approximately:

99.0–101.0% of labelled content (as specified by current IP standards).

Purpose : Ensures potency.

7. Storage

Specifies storage conditions.

Example :

- Store in well-closed containers.
- Protect from moisture.

Purpose : Maintains stability.

8. Labelling

Specifies mandatory information.

Includes

- Drug name
- Strength
- Batch number
- Manufacturing date
- Expiry date

Purpose : Ensures proper identification and traceability.

Significance of IP Monographs

A monograph serves as a complete quality control document because it provides :

- Identity standards
- Purity requirements
- Assay limits
- Storage instructions
- Labeling requirements
- Analytical methods

It enables manufacturers, pharmacists, analysts, and regulatory authorities to evaluate whether a drug complies with official standards.

II. British Pharmacopoeia (BP)

The British Pharmacopoeia (BP) is the official Pharmacopoeia of the United Kingdom, which is published by the British Pharmacopoeia Commission on behalf of the UK government.

Features of BP

1. Authoritative Standards : The British Pharmacopoeia (BP) provides official and legally recognized quality standards for medicines, pharmaceutical substances, and excipients. These standards ensure the safety, purity, strength, and consistency of medicinal products used in healthcare.

2. International Recognition : Although it is the official Pharmacopoeia of the United Kingdom, the BP is widely accepted and used in many countries worldwide. Its high-quality standards make it a trusted reference for pharmaceutical manufacturers and regulatory authorities globally.

3. Detailed Monographs : The BP contains comprehensive monographs that provide detailed information on drug specifications, identification tests, assay methods, impurity limits, storage conditions, and labeling requirements. These

monographs help ensure uniform quality and proper evaluation of pharmaceutical products.

4. Harmonization with International Standards : Many standards in the British Pharmacopoeia are harmonized with the European Pharmacopoeia and other international guidelines. This harmonization promotes consistency in drug quality standards and facilitates global pharmaceutical trade.

Importance of British Pharmacopoeia (BP)

- **Global Acceptance :** The British Pharmacopoeia is recognized and used worldwide as a reliable source of pharmaceutical standards, making it one of the most respected pharmacopoeias.
- **High Scientific Credibility :** BP standards are developed using rigorous scientific evaluation and expert review, ensuring accuracy, reliability, and relevance in pharmaceutical quality control.
- **Extensive Industrial Use :** The pharmaceutical industry extensively uses the BP for manufacturing, quality assurance, quality control, and regulatory compliance, helping maintain high standards for medicinal products.

III. United States Pharmacopeia (USP)

The United States Pharmacopeia (USP) is the official compendium of standards for medicines in the United States, which is published bythe United States Pharmacopeia"a non-governmental scientific organization.

Features of USP

1. Comprehensive Standards : The United States Pharmacopeia (USP) provides comprehensive quality standards for a wide range of healthcare products, including prescription medicines, over-the-counter (OTC) products, dietary supplements, and biological products. These standards help ensure the identity, purity, strength, and quality of pharmaceutical products.

2. Modern analytical methods : USP incorporates advanced, scientifically validated analytical techniques, including High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), spectroscopy, and other chromatographic methods. These techniques enable accurate testing and quality evaluation of medicines and pharmaceutical ingredients.

3. Global Influence : USP standards are widely recognized and accepted worldwide. Many pharmaceutical manufacturers, regulatory agencies, and healthcare organizations rely on USP standards to maintain consistent product quality and facilitate international trade.

4. Reference Standards : USP provides certified reference standards and materials that serve as benchmarks for analytical testing and quality control.

These reference standards help laboratories achieve accurate, reliable, and reproducible test results.

Importance of USP

- **International Credibility :** The USP is highly respected worldwide for its scientifically developed standards and serves as a trusted authority in pharmaceutical quality assurance.
- **Support for Regulatory Compliance :** USP standards help pharmaceutical companies meet regulatory requirements and demonstrate compliance with national and international quality standards.
- **Enhancement of Product Quality and Safety :** By establishing stringent specifications and testing procedures, USP helps ensure the safety, effectiveness, consistency, and overall quality of medicines available to patients.

IV. British Pharmaceutical Codex (BPC)

The **British Pharmaceutical Codex (BPC)** was historically an important pharmaceutical reference book that supplemented the British Pharmacopoeia.The Pharmaceutical Society of Great Britain published it."

Features of BPC

1. Supplementary information : The British Pharmaceutical Codex (BPC) served as a valuable supplementary reference to the British Pharmacopoeia by providing detailed information on drug descriptions, therapeutic uses, pharmaceutical formulations, and dosage recommendations. This additional practical information helped healthcare professionals understand the proper use and preparation of medicines beyond the quality standards provided in pharmacopoeias.

2. Practical reference : BPC was widely used by pharmacists involved in compounding, dispensing, and pharmaceutical practice. Its practical approach and detailed guidance made it an important day-to-day reference for preparing and supplying medicines accurately and safely.

3. Educational value : One of the significant features of the BPC was its educational content. It provided therapeutic and pharmaceutical information that was often not included in the British Pharmacopoeia, making it a useful resource for pharmacy students, educators, and practicing pharmacists seeking a broader understanding of medicines.

Importance of BPC

Essential guide for Pharmacists : Before the development of modern comprehensive pharmacopoeias and drug information resources, the British

Pharmaceutical Codex served as an indispensable practical guide for pharmacists. It bridged the gap between official drug standards and everyday pharmaceutical practice, contributing significantly to professional pharmacy education and patient care.

V. International Pharmacopoeia

The International Pharmacopoeia is published bythe World Health Organizationto promote uniform drug quality standards worldwide.

Objectives

- **Global harmonization :** To establish internationally accepted quality standards.
- **Public health protection :** To ensure the availability of safe medicines globally.
- **Support developing countries :** Provides scientifically validated standards for countries lacking national pharmacopoeias.

Features

1. International scope : Applicable across different nations.

2. Focus on essential medicines : Particular emphasis on the WHO essential medicines.

3. Non-legal status : Unlike national pharmacopoeias, it serves primarily as a reference standard.

4. Scientific reliability : Prepared by international experts.

Significance

- Promotes worldwide standardization.
- Facilitates international trade.
- Supports regulatory authorities.

VI. Other important Pharmacopoeias

1. European Pharmacopoeia (Ph. Eur.) : It is an official collection of quality standards for medicines and pharmaceutical substances used across Europe. The European Directorate for the Quality of Medicines and Healthcare (EDQM) publishes it. It serves as a harmonized reference to ensure the quality, safety, and efficacy of medicinal products across member countries. The Pharmacopoeia provides standardized specifications, analytical methods, and monographs that facilitate regulatory compliance and promote consistent pharmaceutical quality across Europe.

Features

- Used across Europe.
- Harmonized standards.
- Covers pharmaceuticals and biological products.

2. Japanese Pharmacopoeia (JP) : The Japanese Pharmacopoeia (JP) is the official Pharmacopoeia of Japan and serves as the authoritative standard for ensuring the quality, safety, and efficacy of medicines used in the country. It was first published on 25 June 1886, making it one of the oldest pharmacopoeias in Asia. The JP provides detailed standards, monographs, testing procedures, and quality specifications for pharmaceutical substances and preparations. It is regularly revised to incorporate scientific advancements and modern analytical techniques, thereby maintaining high standards of pharmaceutical quality and supporting public health in Japan.

Features

- Ensures the quality of medicines in Japan.
- Frequently revised.
- Includes advanced testing methods.

3. Chinese Pharmacopoeia (ChP) : The Chinese Pharmacopoeia (ChP) is the official Pharmacopoeia of China and serves as the legal standard for the quality control of medicines used within the country. The first edition of the Chinese Pharmacopoeia was published in 1953 by the Chinese government to establish uniform standards for pharmaceutical products. It contains comprehensive monographs, quality specifications, identification tests, assay methods, and regulatory requirements for both modern pharmaceutical products and traditional Chinese medicines. The Pharmacopoeia is periodically revised to incorporate scientific advancements, modern analytical techniques, and updated quality standards, thereby ensuring the safety, efficacy, and consistency of medicines available in China.

Features

- Covers modern and traditional Chinese medicines.
- Extensive herbal monographs.
- Legally enforceable standards.

National Formulary of India (NFI)

It is an authoritative reference document developed to promote the rational, safe, and effective use of medicines in healthcare practice. It provides unbiased and evidence-based information on drug indications, dosage, contraindications, precautions, adverse effects, and therapeutic uses, thereby assisting healthcare

professionals in making informed prescribing decisions. The first edition of the NFI was published in 1960, and it has been periodically revised to reflect advances in medical and pharmaceutical knowledge. The Indian Pharmacopoeia Commission publishes the NFI under the Ministry of Health and Family Welfare, Government of India. It serves as an important guide for physicians, pharmacists, nurses, and students to encourage the rational use of medicines and improve patient care.

Objectives of NFI

1. Rational drug use : One of the primary objectives of the National Formulary of India (NFI) is to promote the rational use of medicines. It encourages healthcare professionals to prescribe, dispense, and use medicines appropriately based on scientific evidence, thereby improving therapeutic outcomes and minimizing medication-related risks.

2. Uniform drug information : The NFI provides standardized, accurate, and reliable information on medicines to healthcare professionals nationwide. By providing uniform drug information, it helps ensure consistent prescribing practices and reduces confusion arising from multiple sources.

3. Support for healthcare professionals : The National Formulary of India serves as a valuable reference for physicians, pharmacists, nurses, and students. It provides essential information on drug indications, dosage, contraindications, precautions, adverse effects, and therapeutic uses, enabling healthcare professionals to make informed decisions and deliver safe, effective, and evidence-based patient care.

Contents of NFI

1. Drug information

- Generic names
- Dosages
- Indications
- Contraindications

2. Patient safety information

- Adverse effects
- Drug interactions
- Precautions

3. Therapeutic guidance

- Disease-wise treatment recommendations

Importance of NFI

1. Promotes evidence-based prescribing : The National Formulary of India (NFI) promotes evidence-based prescribing by providing scientifically validated and up-to-date information on medicines. This helps healthcare professionals select the most appropriate drugs based on safety, efficacy, and therapeutic value, thereby improving patient outcomes.

2. Reduces medication errors : By providing accurate, standardized drug information, the NFI helps minimize medication errors across prescribing, dispensing, and administration. Clear guidance on dosage, indications, contraindications, and precautions enhances patient safety and supports the rational use of medicines.

3. Encourages the use of essential medicines : The NFI encourages the selection and use of essential medicines that are proven to be safe, effective, and cost-efficient. This supports rational healthcare practices, improves accessibility to necessary treatments, and contributes to better public health outcomes, particularly in resource-limited settings.

Introduction to Prescription

A prescription is a written, verbal, or electronic order from a registered medical practitioner directing a pharmacist to prepare and dispense a specific medication for a patient. It serves as a legal document, a communication tool between the prescriber and pharmacist, and a guide for the patient regarding the proper use of medicines. The term prescription originates from the Latin word prescriptions, meaning "a written direction." A properly written prescription ensures the safe, effective, and rational use of medicines while minimizing medication errors and adverse drug reactions.

Prescription is defined as "A written order issued by a registered medical practitioner, dentist, or other authorized healthcare professional directing a pharmacist to dispense a specified medicine to a patient with instructions for its use."

The prescription is one of the most important documents in pharmaceutical practice because it forms the basis for dispensing medicines and maintaining patient records. It reflects the prescriber's diagnosis, treatment plan, and therapeutic intentions.

Importance of Prescription

A prescription plays a crucial role in healthcare because it:

- Ensures rational use of medicines.
- Provides legal authorization for dispensing drugs.

- Communicates therapeutic instructions to the pharmacist.
- Guides patients regarding medication use.
- Reduces medication errors.
- Serves as a permanent medical record.
- Facilitates monitoring of treatment outcomes.

Objectives of a Prescription

The primary objectives of a prescription are:

1. Accurate drug therapy : To ensure that the patient receives the correct medicine in the correct dose and dosage form.

2. Patient safety : To minimize adverse drug reactions, overdosing, and medication errors.

3. Communication : To establish clear communication between the prescriber, pharmacist, and patient.

4. Legal documentation : To provide a permanent legal record of treatment.

5. Therapeutic effectiveness : To achieve the desired clinical outcome through proper medication use.

Parts of a Prescription

1. Date : The date indicates when the prescription was written.

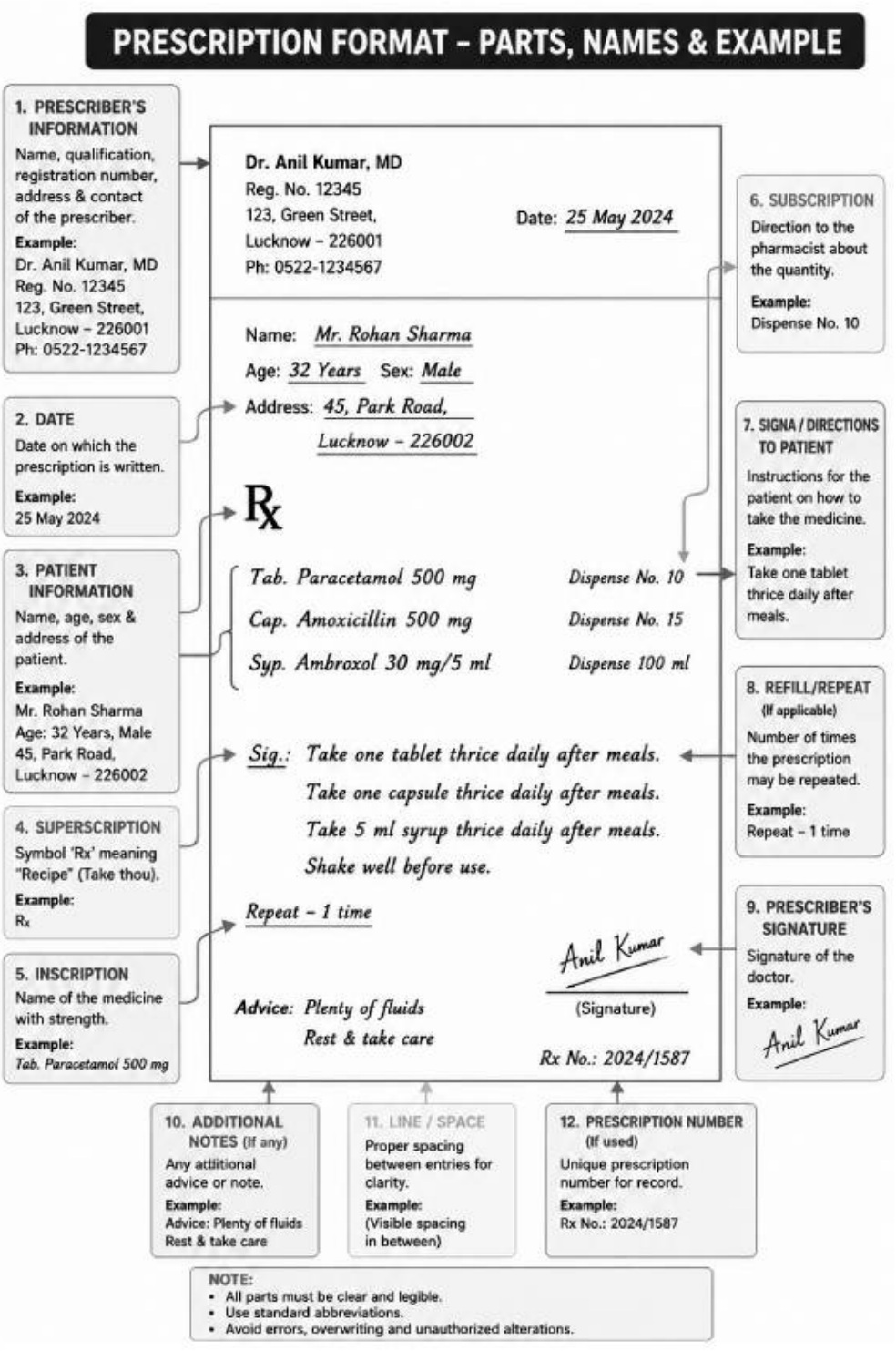
Importance

- Determines prescription validity.
- Helps monitor treatment duration.
- Essential for refill authorization.
- Important for legal documentation.

2. Patient Information : This section contains details about the patient.Patient information is essential because drug doses often depend on age, weight, and physiological condition. Proper identification prevents the wrong person from receiving medicines. It includes:

- Patient's name
- Age
- Gender
- Address
- Weight (especially in pediatric patients)

3. Superscription (Rx) : The superscription is represented by the symbol(R_x). The symbol Rx originates from the Latin word "Recipe," meaning "Take thou."It indicates the beginning of the prescription and authorizes the pharmacist to dispense the medication.


PRESCRIPTION FORMAT – PARTS, NAMES & EXAMPLE
1. PRESCRIBER'S INFORMATION
Name, qualification, registration number, address & contact of the prescriber.
Example:
Dr. Anil Kumar, MD
Reg. No. 12345
123, Green Street,
Lucknow – 226001
Ph: 0522-1234567
2. DATE
Date on which the prescription is written.
Example:
25 May 2024
3. PATIENT INFORMATION
Name, age, sex & address of the patient.
Example:
Mr. Rohan Sharma
Age: 32 Years, Male
45, Park Road,
Lucknow – 226002
4. SUPERSCRIPTION
Symbol 'Rx' meaning "Recipe" (Take thou).
Example:
℞
5. INSCRIPTION
Name of the medicine with strength.
Example:
Tab. Paracetamol 500 mg
Dr. Anil Kumar, MD
Reg. No. 12345
123, Green Street,
Lucknow – 226001
Ph: 0522-1234567
Date: 25 May 2024
Name: Mr. Rohan Sharma
Age: 32 Years Sex: Male
Address: 45, Park Road,
Lucknow – 226002
℞
Tab. Paracetamol 500 mg Dispense No. 10
Cap. Amoxicillin 500 mg Dispense No. 15
Syp. Ambroxol 30 mg/5 ml Dispense 100 ml
Sig.: Take one tablet thrice daily after meals.
Take one capsule thrice daily after meals.
Take 5 ml syrup thrice daily after meals.
Shake well before use.
Repeat – 1 time
Advice: Plenty of fluids
Rest & take care
Anil Kumar
(Signature)
Rx No.: 2024/1587
6. SUBSCRIPTION
Direction to the pharmacist about the quantity.
Example:
Dispense No. 10
7. SIGNA / DIRECTIONS TO PATIENT
Instructions for the patient on how to take the medicine.
Example:
Take one tablet thrice daily after meals.
8. REFILL/REPEAT (If applicable)
Number of times the prescription may be repeated.
Example:
Repeat – 1 time
9. PRESCRIBER'S SIGNATURE
Signature of the doctor.
Example:
Anil Kumar
10. ADDITIONAL NOTES (If any)
Any additional advice or note.
Example:
Advice: Plenty of fluids
Rest & take care
11. LINE / SPACE
Proper spacing between entries for clarity.
Example:
(Visible spacing in between)
12. PRESCRIPTION NUMBER (If used)
Unique prescription number for record.
Example:
Rx No.: 2024/1587
NOTE:
• All parts must be clear and legible.
• Use standard abbreviations.
• Avoid errors, overwriting and unauthorized alterations.

4. Inscription : The inscription contains details of the medicine prescribed.It forms the core of the prescription and specifies the exact medication required.It includes:

- Drug name
- Strength
- Dosage form
- Quantity

5. Subscription : The subscription provides instructions to the pharmacist regarding preparation and dispensing.It specifies the quantity to be supplied and, when necessary, any compounding instructions.

6. Signa or Signature (Sig) : The signa contains directions for the patient.Ensures proper administration and therapeutic effectiveness. It includes:

- Dose
- Frequency
- Route of administration
- Duration of treatment

Example: Take one tablet orally three times daily after meals for 5 days.

7. Prescriber's Information : This section contains the details of the prescribing practitioner.Identifies the authorized prescriber and enables verification if required.It includes:

- Name
- Qualification
- Registration number
- Clinic or hospital address
- Contact details

8. Signature of Prescriber : The prescriber must sign the prescription. It is required for:

- Confirms authenticity.
- Provides legal validity.
- Prevents misuse and forgery.

Handling of Prescriptions

Handling a prescription refers to the systematic process pharmacists follow from receiving the prescription to dispensing the medication.Proper handling is essential to ensure patient safety and compliance with legal requirements.

Steps in handling a prescription

1. Receiving the prescription : The first step in prescription handling is receiving the prescription from the patient or healthcare provider. The pharmacist

carefully examines the prescription to ensure that it is complete, legible, and authentic. This initial verification helps prevent errors and ensures the prescription is processed safely and accurately.

2. Reading and interpreting the prescription : The pharmacist thoroughly reviews the prescription to understand the prescribed medication, including its name, strength, dosage, frequency, and treatment duration. Accurate interpretation is essential to avoid dispensing errors and ensure that the patient receives the correct therapy.

3. Checking patient information : Before dispensing the medication, the pharmacist verifies key patient details, including age, weight, allergy history, and medical conditions. This assessment helps determine whether the prescribed medicine is appropriate and safe for the individual patient.

4. Screening for prescription errors : The prescription is carefully evaluated for potential errors, including incorrect doses, drug interactions, duplicate therapies, contraindications, and known allergies. This critical review process helps protect patient safety and minimizes the risk of medication-related problems.

5. Clarification with the prescriber : Whenever a prescription contains unclear handwriting, missing information, inappropriate drug strength, or any doubtful instruction, the pharmacist contacts the prescriber for clarification. Effective communication between the pharmacist and prescriber helps prevent medication errors and ensures accurate treatment.

6. Compounding or dispensing : After verification, the pharmacist prepares and dispenses the prescribed medication. This may involve selecting the correct product, accurately measuring ingredients, or compounding a customized formulation when required. Proper dispensing ensures the quality and accuracy of the medication supplied.

7. Labelling : Appropriate labels are attached to the medication container containing essential information such as the patient's name, drug name, dosage instructions, storage conditions, and necessary warning statements. Clear and accurate labeling helps patients use their medicines safely and effectively.

8. Patient counselling : Before handing over the medicine, the pharmacist provides counseling regarding the dosage schedule, method of administration, possible side effects, storage requirements, and actions to take if a dose is missed. Effective counseling improves patient understanding, adherence to therapy, and overall treatment outcomes.

9. Record keeping : Proper maintenance of prescription records is an important professional and legal responsibility of the pharmacist. These records serve as valuable references for future treatment, support pharmacovigilance

activities, ensure regulatory compliance, and assist in monitoring the use of controlled substances.

Care is required in dispensing prescriptions

- The prescription must be carried with the pharmacist when taking the medicine off the shelves.
- Ensure the drug name, dose, and dosage form are clear.
- All the chemicals should be returned to their original positions on the shelf.
- Care should be taken to keep the balance clean after each measurement.
- For liquid preparations for external use, the label must display FOR EXTERNAL USE ONLY in red ink.
- Before handing over the medicine to the patient, the preparation should be checked again.
- Select suitable containers for the dosage form (e.g., amber bottles for light-sensitive drugs).
- Ensure tight sealing to prevent leakage or spoilage.
- Avoid using contaminated or old containers.
- In patient counselling, explain how and when to take the medicine.
- Instruct about possible side effects or precautions.
- Advise on storage conditions and course completion (especially for antibiotics).

Errors in prescription

1. Abbreviations : The use of ambiguous, unclear, or non-standard abbreviations often leads to misunderstandings among doctors, pharmacists, and patients. Different practitioners may interpret the same abbreviation in different ways, resulting in wrong drug administration.

Example:

- "OD" may mean once daily or right eye (oculus dexter).
- "IU" (International Unit) can be misread as "IV" (intravenous).

2. Name of the drug : There are certain drugs whose names look or sound like those of other drugs. Some examples of such drugs are as follows.

Example:

- Prednisolone vs Prednisone
- Hydralazine vs Hydroxyzine

Result: Patient receives a completely different drug, leading to therapeutic failure or toxicity.

3. Strength of the preparation : If the strength of the drug (e.g., 250 mg, 500 mg, 1 g) is not clearly written or incorrectly written, it can cause overdosage or underdosage.

Example:

- Digoxin 0.25 mg vs 0.125 mg — overdose may cause cardiac toxicity.
- Insulin 40 IU/mL vs 100 IU/mL — wrong strength can be dangerous.

Result: Ineffective therapy or serious adverse effects.

4. Dose : Wrong dose : Prescribing an incorrect dose, either too high or too low, can lead to adverse effects or ineffective treatment.

- **Unclear instructions :** Important details regarding frequency, timing, and route of administration may be omitted or written ambiguously. For example, a patient might receive a sustained-release drug but be instructed to take it too frequently.
- **Incorrect timing :** Administering a drug at the wrong time relative to food intake can alter its absorption and effectiveness.

5. Incompatibilities : Incompatibilities refer to unwanted reactions between different medications or foods. They are as follows:

- **Drug-drug interactions :** Prescribing multiple drugs without checking for potentially harmful interactions can cause serious side effects. A common example is prescribing an NSAID with an anticoagulant, which increases the risk of bleeding.
- **Drug-food interactions :** Certain drugs have poor absorption when taken with specific foods. For example, tetracycline should not be taken with milk or antacids.
- **Contraindications :** Prescribing a drug to which the patient has a known allergy or other contraindication is a serious and avoidable error.

6. Instructions for the Patient : If the **directions for use** are incomplete, unclear, or missing, the patient may take the medicine incorrectly.

- Errors may also occur if important warnings (such as storage or external use) are not provided.

Example:

- "Take one tablet daily" (without specifying whether it should be taken in the morning or evening).
- Ointment labelled without the "For external use only" warning.

Latin Terminology Related to Prescriptions

General terms

S. No.	Term/ Phrase	Abbreviation	Meaning
1.	Alterna (or) Alternis	Alt.	Alternate
2.	Ana	aa. (or) a a.	Of each
3.	Anti (or) Ante	a.	Before
4.	Concentratus	conc.	Concentrated
5.	Cum	c. (or) c.	With
6.	Dilutum (or) Dilutus	dil.	Dilute (or) Diluted
7.	Dimidius (or) Dimidus	dim.	Half
8.	Dimidium	dimid.	Half
9.	Duplo	dup:	Twice
10.	Duplum	duplum	Twice the quantity
11.	E	E (or) e	With
12.	Et	et	And
13.	Ex	ex	Out of
14.	Fortis	fort.	Strong
15.	Id est	i.e.	That is
16.	In phiala	in phiala	In a bottle
17.	Inter	inter	In between
18.	Lente	lente	Slowly
19.	Levis	lev.	Light
20.	Mitis	mit.	Mild
21.	Mollis	moll	Soft
22.	Non	non	Not
23.	Nota bene	N.B.	Note Well
24.	Omne (or) Omnis	O. (or) Om.	Every (or) All
25.	Partesaequales	p. aeq. (or) pt.aeg.	Equal parts
26.	Paullum (or) Paullulum	paul.	A little
27.	Pauxillum	paux.	A Little

28.	Per	per	By (or) Through
29.	Post	p.	After
30.	Pro	pro	For (or) On behalf of
31.	Quantitas duplex	qt.dx	Twice the quantity
32.	Quantitatemsufficiente m (or) Quantum Sufficiat (or) Quantum sufficit	q.s.	Sufficient quantity (or) As much as is sufficient
33.	Quaque	q.	Each (or) Every
34.	Recipe	Rx	(You) Take
35.	Repetantur (or)Repitatur (or) Repitatur	Rep. (or) rept.	Let (it) be repeated
36.	Saturata	Sat.	Saturated
37.	SecundumArtem	s.a.	According to art (or) Pharmaceutically
38.	Semel	semel	Once
39.	Semis (or) Semissis	S. (or) fs. (or) s s.	One Half
40.	Signa (or) Signetur	s. (or) sig.	Label (or) You write
41.	Simul	simul	Together
42.	Singulis	sing.	Each
43.	Somnus	somn.	Sleep
44.	Super	super	Upon
45.	Tussi	tussi	Cough
46.	Vel	v.(or) vel	Or
47.	Videlicet	viz.	Namely

Terms Relating to Remedy

1.	Applicatio	applic.	An application
2.	Aurinarium	aurin.	An ear cone
3.	Auristillae	auristill	Ear drops
4.	Buginarium	buginar.	A nasal bougie
5.	Capsula	caps	A Capsule

6.	CapsulaAmylacea	caps. amylac.	A Cachet
7.	CapsulaGelatina	caps. gelat.	A Gelatin Capsule
8.	CapsulaVitrea	caps.vitrea	A Glass Capsule
9.	Cataplasma	catapl. (or) cataplasm.	A poultice
10.	Cereolus	cereol.	An Urethral Bougie
11.	Charta	chart.	A Powder
12.	Collunarium	collun.	A Nose wash (or) A Nasal douche
13.	Colltorium	collut.	A Mouth wash
14.	Collyrium	coll. (or) collyr.	An Eye lotion
15.	Confectio	confect.	A Confection
16.	Cremor	crem.	A Cream
17.	Decoctum	decoct.	A Decoction
18.	Dentifricium	dentifrice.	A Tooth Powder
19.	Depilatorium	depilate.	A Depilatory
20.	Elixir	elix.	An Elixir
21.	Emplastrum	emp. (or) empl	A Plaster
22.	Emulsio (or) Emulsum	emul. (or) emuls.	An Emulsion
23.	Enema (or) Enemata	en. (or) enema.	An Enema
24.	Extractum	extr.	An Extract
25.	Fluidum	fl.	A Fluid
26.	Gargarisma	garg.	A Gargle
27.	Gelatina	gelat.	A Jelly
28.	Glycerinum	glyc. (or) glycerin.	A Glycerin
29.	Granula (or) Granulatum (or)Granulum	granule.	Granules
30.	Gutta	gutt.	A drop
31.	Guttae	gtt.	Drops

32.	Haustus	ht. (or) haust.	A Draught
33.	Infusum	inf.	An Infusion
34.	Inhalatio	inhal.	An Infusion
35.	Injectio	inj.	An Inhalation
36.	InjectioHypodermica	inj.hyp.	An Injection
37.	Insufflatio	insuff. (or) insuffl.	A Hypodermic Injection
38.	Irrigatio	irrig.	An Insufflation
39.	Lamella	lamel.	An Irrigation
40.	Ligamentum	ligament.	A small Disc for putting in theEye
41.	Linctus	linct.	A Bandage
42.	Linimentum	lin.	A Linctus (or) A Cough Mixture
43.	Liquor	liq	A Liniment
44.	Lotio	lot.	A Solution
45.	Mistura	m. (or) mist.	A Lotion
46.	Mucilago	mucilage	A Mixture
47.	Naristillae	narist.	Nasal Drops
48.	Nebula	neb. (or) nebul.	A Spray Solution
49.	Oblatum	oblat.	A Cachet
50.	Oculentum	oculent.	An Eye Ointment
51.	Oculoguttae	oculoguttae	Eye drops
52.	Pasta	past.	A Paste
53.	Pastillus	pastill.	A Pastille
54.	Pessus	pess.	A Pessary
55.	Pigmentum	pig. (or) pigm.	A Paint (or) A Pigment
56.	Pilula	pil.	A Pill
57.	Pulvis	pulv.	A powder

EXERCISE

Multiple Choice Questions

1. **Pharmacy is the profession concerned with:**
   (a) Diagnosis of diseases
   (b) Preparation, dispensing, and proper use of medicines
   (c) Performing surgeries
   (d) Conducting radiological tests
   Answer : (b) Preparation, dispensing, and proper use of medicines
2. **The Pharmacy Act was passed in India in:**
   (a) 1940 (b) 1945
   (c) 1948 (d) 1956
   Answer : (c) 1948
3. **The Pharmacy Council of India (PCI) was established under :**
   (a) Drugs and Cosmetics Act
   (b) Pharmacy Act, 1948
   (c) Medical Council Act
   (d) Education Act
   Answer : (b) Pharmacy Act, 1948
4. **Which of the following regulates pharmacy education in India?**
   (a) WHO (b) PCI
   (c) ICMR (d) CDSCO
   Answer : (b) PCI
5. **The first pharmacy institution in India was established at:**
   (a) Delhi (b) Mumbai
   (c) Banaras (d) Kolkata
   Answer : (d) Kolkata
6. **The pharmaceutical industry is mainly concerned with:**
   (a) Drug manufacturing and development
   (b) Surgery
   (c) Nursing care
   (d) Pathology testing
   Answer : (a) Drug manufacturing and development
7. **A community pharmacist primarily works in:**
   (a) Research laboratory (b) Retail pharmacy
   (c) Manufacturing unit (d) Blood bank
   Answer : (b) Retail pharmacy

8. Which pharmacist is directly involved in patient care and medication monitoring?

(a) Industrial Pharmacist

(b) Community Pharmacist

(c) Clinical Pharmacist

(d) Production Manager

Answer : (c) Clinical Pharmacist

9. Hospital pharmacists are responsible for:

(a) Marketing medicines

(b) Dispensing medicines to hospital patients

(c) Conducting surgeries

(d) Drug advertising

Answer : (b) Dispensing medicines to hospital patients

10. Research and Development (R&d) in pharmacy deals with:

(a) Drug discovery and formulation development

(b) Drug sales only

(c) Drug transportation

(d) Hospital management

Answer : (a) Drug discovery and formulation development

11. The official book containing standards for drugs in India is:

(a) BP (b) USP

(c) IP (d) BPC

Answer : (c) IP

12. IP stands for:

(a) Indian Pharmacy

(b) Indian Pharmacology

(c) Indian Pharmacopoeia

(d) International Pharmacy

Answer : (c) Indian Pharmacopoeia

13. The Indian Pharmacopoeia is published by:

(a) PCI (b) Indian Pharmacopoeia Commission

(c) CDSCO (d) WHO

Answer : (b) Indian Pharmacopoeia Commission

14. The headquarters of the Indian Pharmacopoeia Commission is at:

(a) New Delhi (b) Mumbai

(c) Ghaziabad (d) Hyderabad

Answer : (c) Ghaziabad

15. BP stands for:

(a) British Pharmacology (b) British Pharmacopoeia

(c) Basic Pharmacopoeia (d) British Pharmacy

Answer : (b) British Pharmacopoeia

16. USP stands for:

(a) United States Pharmacopoeia

(b) Universal Standard Pharmacopoeia

(c) United States Pharmacy

(d) Universal Scientific Pharmacy

Answer : (a) United States Pharmacopoeia

17. BPC stands for:

(a) British Pharmaceutical Codex

(b) British Pharmacy Council

(c) Basic Pharmaceutical Code

(d) British Pharmacological Code

Answer : (a) British Pharmaceutical Codex

18. The International Pharmacopoeia is published by:

(a) PCI (b) WHO

(c) FDA (d) CDSCO

Answer : (b) WHO

19. National Formulary of India provides:

(a) Official standards of drugs only

(b) Information for rational use of medicines

(c) Manufacturing licenses

(d) Hospital records

Answer : (b) Information for rational use of medicines

20. A monograph in a pharmacopoeia contains:

(a) Drug advertisements

(b) Standards and specifications of a drug

(c) Medical records

(d) Research papers

Answer : (b) Standards and specifications of a drug

21. The symbol "Rx" in a prescription is called:

(a) Inscription (b) Subscription

(c) Superscription (d) Signa

Answer : (c) Superscription

22. The inscription part of a prescription contains:

(a) Directions to the patient

(b) Name and quantity of ingredients
(c) Signature of doctor
(d) Date of issue
Answer : (b) Name and quantity of ingredients

23. Subscription in a prescription refers to:
(a) Directions to the pharmacist
(b) Directions to the patient
(c) Drug name
(d) Patient details
Answer : (a) Directions to the pharmacist

24. Signa (Sig.) in a prescription indicates:
(a) Doctor's registration number
(b) Directions for the patient
(c) Drug quantity
(d) Prescription number
Answer : (b) Directions for the patient

25. Which part of a prescription contains patient information?
(a) Heading (b) Body
(c) Signa (d) Subscription
Answer : (a) Heading

26. Before dispensing a prescription, a pharmacist should first:
(a) Pack the medicine
(b) Verify the prescription for completeness and legality
(c) Calculate profit
(d) Contact the manufacturer
Answer : (b) Verify the prescription for completeness and legality

27. The Latin abbreviation "b.i.d." means:
(a) Once daily (b) Twice daily
(c) Three times daily (d) Four times daily
Answer : (b) Twice daily

28. The Latin abbreviation "t.i.d." means:
(a) Once daily (b) Twice daily
(c) Three times daily (d) Four times daily
Answer : (c) Three times daily

29. The abbreviation "q.i.d." means:
(a) Four times daily (b) Twice daily
(c) Every week (d) At bedtime

Answer : (a) Four times daily

30. The abbreviation "p.r.n." means:

(a) Before meals (b) After meals

(c) As needed (d) At bedtime

Answer : (c) As needed

▼ Fill in the Blanks

1. The profession concerned with the preparation, dispensing, and proper use of medicines is called _____.

   Answer : Pharmacy

2. The _____ Act, 1948 regulates the pharmacy profession in India.

   Answer : Pharmacy

3. The Pharmacy Council of India (PCI) was established in the year _____.

   Answer : 1948

4. The official book of drug standards in India is the _____ Pharmacopoeia.

   Answer : Indian

5. The _____ Pharmacopoeia Commission publishes the Indian Pharmacopoeia.

   Answer : Indian

6. The headquarters of the Indian Pharmacopoeia Commission is located at _____.

   Answer : Ghaziabad

7. BP stands for British _____.

   Answer : Pharmacopoeia

8. USP stands for United States _____.

   Answer : Pharmacopoeia

9. BPC stands for British Pharmaceutical _____.

   Answer : Codex

10. The International Pharmacopoeia is published by the _____.

    Answer : WHO (World Health Organization)

11. The National Formulary of India provides information for the _____ use of medicines.

    Answer : Rational

12. A pharmacist working in a retail medical store is called a _____ pharmacist.

    Answer : Community

13. A pharmacist involved in direct patient care and medication monitoring is known as a _____ pharmacist.
Answer : Clinical

14. Drug discovery and development are major activities of pharmaceutical _____ and Development (R&D).
Answer : Research

15. The symbol _____ is used at the beginning of a prescription.
Answer : Rx

16. The part of a prescription containing the names and quantities of drugs is called the _____.
Answer : Inscription

17. The directions given to the patient in a prescription are called _____.
Answer : Signa (Sig.)

18. The Latin abbreviation "b.i.d." means _____ daily.
Answer : Twice

19. The Latin abbreviation "t.i.d." means _____ times daily.
Answer : Three

▼ Short Answer Questions

1. Define pharmacy. Discuss the importance of pharmacy in healthcare.
2. Write a short note on the history and development of pharmacy education in India.
3. What are the roles and responsibilities of a community pharmacist?
4. Differentiate between hospital pharmacy and clinical pharmacy.
5. What are the major functions of an industrial pharmacist?
6. Define Pharmacopoeia. Mention the objectives of a pharmacopoeia.
7. Write short notes on the Indian Pharmacopoeia (IP) and its significance.
8. What is a monograph in the Indian Pharmacopoeia? List its main contents.
9. Describe the different parts of a prescription.

▼ Long Answer Questions

1. Discuss the history of the pharmacy profession in India. Explain the evolution and development of pharmacy education, pharmaceutical industries, and professional organizations in India.
2. Describe the scope of the pharmacy profession. Explain the roles and responsibilities of pharmacists in community pharmacy, hospital pharmacy, clinical pharmacy, and industrial pharmacy.

3. Define Pharmacopoeia. Compare the Indian Pharmacopoeia (IP), British Pharmacopoeia (BP), United States Pharmacopeia (USP), British Pharmaceutical Codex (BPC), and International Pharmacopoeia.
4. Explain the structure and contents of the Indian Pharmacopoeia. Discuss in detail the various sections of a typical IP monograph with suitable examples.
5. Define prescription. Explain the structure, format, and parts of a prescription. Discuss the handling of prescriptions and the importance of Latin terminology in prescription writing.
6. Explain the role of pharmacists in pharmaceutical research and development (R&D).
7. Explain the importance of pharmacopoeias in maintaining the quality, safety, and efficacy of medicines.

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