



Notes by PharmacoLearn

General Pharmacy

BP102T — B.Pharm Semester I

Rapid Revision Notes

One-night-pass companion: every topic, only the core

As per PCI B.Pharm (NEP 2020) syllabus

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Unit I — Introduction to the Profession of Pharmacy

This unit is pure memory — dates, names, definitions. Read it once with the timeline, once with the mnemonics, and it converts straight into short-note marks.

History of the Profession of Pharmacy in India

Before the British, medicines in India came from Ayurveda, Unani and Siddha, made by vaidyas and hakims. Modern pharmacy grew on three tracks — education, industry, and professional organisations. Learn the timeline in order:

- 1899 — Acharya P.C. Ray set up the Bengal Chemical and Pharmaceutical Works, Calcutta. Birth of the Indian pharma industry.
- 1901 — Alembic Chemical Works set up at Baroda.
- 1937 — First B.Pharm course in India, at BHU, Varanasi. The single most-asked date in this topic.
- 1940 — Drugs and Cosmetics Act passed — manufacture and sale of drugs came under legal control.
- 1948 — Pharmacy Act passed; Pharmacy Council of India (PCI) constituted. PCI regulates pharmacy education and registers pharmacists.
- 1955 — First edition of the Indian Pharmacopoeia published.

Organisations to name-drop: PCI (statutory body under the Pharmacy Act, 1948 — education standards + pharmacist register), AICTE (approves pharmacy institutions), IPA (Indian Pharmaceutical Association — professional body), IDMA and OPPI (industry bodies).

Remember: 1899 Ray → 1901 Alembic → 1937 BHU → 1940 D&C Act → 1948 PCI → 1955 IP.
In the exam, write it as a timeline — examiners award chronology.

Scope of the Pharmacy Profession

Never mix the three heads in an answer. Each asks for role and responsibilities separately.

Retail / community pharmacy

- Dispenses medicines against prescriptions; counsels on dose, timing and storage.
- Sells OTC products; advises on first aid and minor ailments.
- Checks every prescription for errors — wrong dose, interactions, illegible writing — and contacts the prescriber instead of guessing.
- Maintains legal records (narcotic registers, prescription files); promotes completing antibiotic courses.

Hospital and clinical pharmacy

- Runs the hospital drug store — procurement, cold-chain storage (vaccines, insulin), ward distribution.
- Prepares sterile products (IV admixtures); handles cytotoxic drugs.
- Clinical pharmacy: ward rounds, drug-therapy monitoring, ADR reporting under PvPI, advising doctors on interactions and dose adjustment.
- Discharge counselling for chronic patients (diabetes, hypertension).

Industrial pharmacy (including R&D)

- Production under GMP; QC/QA testing against pharmacopoeial standards.
- R&D — formulation development, analytical methods, clinical-trial support.
- Regulatory affairs — approval dossiers (CDSCO in India; USFDA/EMA for exports); medical representatives promote products to doctors.

Pharmacopoeias

A pharmacopoeia is an official book laying down standards of identity, purity, strength and quality for drugs. Standards are legally enforceable — a drug listed in the IP must meet IP standards.

- IP (Indian Pharmacopoeia) — published by the IPC, Ghaziabad. Legal standard for drugs in India under the Drugs and Cosmetics Act.
- BP (British Pharmacopoeia) — UK (MHRA); used across Commonwealth countries.
- USP (United States Pharmacopeia) — legal standard in the USA.
- BPC (British Pharmaceutical Codex) — historical: last edition 1973, absorbed into the BNF. The syllabus names it, so know it — but never cite it as current.
- International Pharmacopoeia — published by the WHO; for countries with no national pharmacopoeia.
- NFI (National Formulary of India) — also from IPC. IP sets standards (what the drug must be); NFI gives prescribing guidance (how it is used — doses, formulations).

Remember: IP = standards, NFI = prescribing guidance. Both from IPC, Ghaziabad. That one line answers a favourite 2-mark question.

Structure and content of the Indian Pharmacopoeia

- Monographs — the core; one per drug substance or formulation.
- General notices — rules for interpreting the whole book.
- General chapters — test methods (limit tests, dissolution, sterility).
- Appendices — reference standards, reagents, procedures.
- Recent editions also cover vaccines, sera, biotechnology products and herbal drugs.

Model IP monograph (e.g., Paracetamol) — the skeleton

- 1 Title — official name. 2. Chemical name + structural formula. 3. Description — appearance. 4. Identification — tests proving identity. 5. Tests — purity checks (related substances, heavy metals, loss on drying). 6. Assay — quantitative strength (e.g., 98.0–101.0%). 7. Storage. 8. Labelling. 9. Category / dose.

Introduction to Prescription

A prescription is a written order from a registered medical practitioner to the pharmacist to supply/compound medicines. Clinical document and legal document.

Parts of a prescription (7)

- 1 Date — must be dated. 2. Patient information — name, age, sex, address (weight for children). 3. Superscription — the symbol Rx (Latin recipe, "take thou"). 4. Inscription — names and quantities of medicaments ordered. 5. Subscription — directions to the pharmacist ("mix and make 10 powders"). 6. Signatura — directions to the patient (dose, frequency, route). 7. Prescriber's signature, name and registration number — without this it is invalid.

Mnemonic: Date – Patient – Superscription – Inscription – Subscription – Signatura – Signature → "Daily Patients Surely Intake Syrups Simply Smiling."

Handling of prescriptions (order matters)

- 1 Receiving — check date and prescriber details. 2. Reading and checking — verify doses, interactions, incompatibilities. 3. Compounding/dispensing. 4. Labelling — patient name, directions, date, pharmacy details. 5. Pricing and recording — prescription register. 6. Delivering and counselling.

Remember: If a dose looks wrong, a name is illegible, or an interaction looks dangerous — do not guess, contact the prescriber. This one line earns marks in every handling answer.

Latin terminology (learn as "expand the following")

Short form	Latin	Meaning
Rx	Recipe	Take thou
a.c.	Ante cibum	Before meals
p.c.	Post cibum	After meals
o.d.	Omne in die	Once daily
b.i.d.	Bis in die	Twice daily

Short form	Latin	Meaning
t.i.d.	Ter in die	Three times daily
q.i.d.	Quater in die	Four times daily
h.s.	Hora somni	At bedtime
s.o.s. / p.r.n.	Si opus sit / Pro re nata	When required
stat	Statim	Immediately
q.s.	Quantum sufficiat	Sufficient quantity
aq.	Aqua	Water
mist.	Mistura	Mixture
tab.	Tabella	Tablet
cap.	Capsula	Capsule
ung.	Unguentum	Ointment
lot.	Lotio	Lotion
gtt.	Guttae	Drops

Remember: b.i.d./t.i.d./q.i.d. are bis/ter/quater in die — 2, 3, 4 times daily. stat = immediately, q.s. = sufficient quantity. Latin stays because it is short, precise and internationally understood.

Very short questions (2 marks)

- 1 In which year did the first B.Pharm course start in India, and where?
- 2 Expand PCI and state its function in one line.
- 3 What is the difference between the IP and the National Formulary of India?
- 4 Expand Rx, b.i.d. and stat.
- 5 Define pharmacopoeia.

Short questions (5 marks)

- 1 Trace the history of pharmacy education in India with a timeline.
- 2 Describe the role and responsibilities of a pharmacist in hospital pharmacy.
- 3 Write a short note on the parts of a prescription.

Long questions (10 marks)

- 1 Discuss the scope of the pharmacy profession under the three heads: community, hospital/clinical, and industrial pharmacy.

- 2 Describe the structure and content of the Indian Pharmacopoeia, and explain the salient features of a model IP monograph.

How to approach these answers

- Very-short Q1: one year + one place (1937, BHU Varanasi); don't add a story.
- Very-short Q2: full form + one function line.
- Very-short Q3: one line — IP sets standards, NFI gives prescribing guidance; both by IPC.
- Very-short Q4: exact Latin expansion + meaning for each; spelling counts.
- Very-short Q5: definition only — official book of identity, purity, strength, quality standards.
- Short Q1: open with the pre-British line, then the six milestones as a dated list, close with one line on PCI.
- Short Q2: define hospital pharmacy in one line, then 6 points under ward/store/clinical heads.
- Short Q3: list the 7 parts with the mnemonic, one line each; end with "signature + registration number = valid".
- Long Q1: intro line, then 3 subheads (community / hospital / industrial) with 5–6 points each, one-line conclusion on the pharmacist as link between doctor and patient.
- Long Q2: intro (what IP is), body under 3 subheads — publishing body & legal status, structure/content, monograph skeleton (numbered) — close with one line on why monographs matter.

Unit II — Introduction to Pharmaceutical Calculations and Dosage Forms

The maths unit. Every calculation follows a fixed formula — write the formula, plug in numbers, collect marks. Alongside it, the language of dosage forms: routes, API, excipients.

Metric system of weights and measures

Pharmacy runs on metric: grams for weight, litres for volume. Convert everything to one unit before calculating.

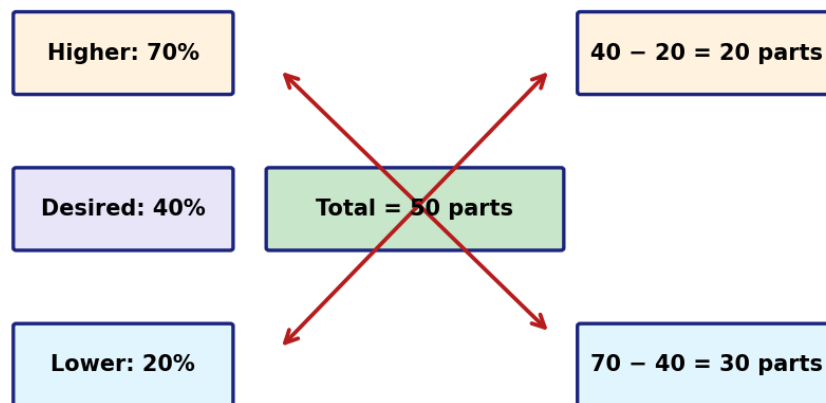
- 1 kg = 1000 g; 1 g = 1000 mg; 1 mg = 1000 micrograms (mcg/μg); 1 L = 1000 mL.
- Household: 1 teaspoon ≈ 5 mL; 1 tablespoon ≈ 15 mL; 20 drops ≈ 1 mL.
- Scientific notation for very small/large quantities: 0.00025 g = 2.5×10^{-4} g.

Alligation

Alligation mixes two preparations of different strengths to get an intermediate strength. Parts of higher-strength = $D - L$; parts of lower-strength = $H - D$; total parts = $H - L$.

Alligation Alternate — Worked Example

Prepare 500 mL of 40% alcohol from 70% and 20% alcohol



1 part = $500 \div 50 = 10$ mL $\rightarrow$ 70% alcohol = $20 \times 10 = 200$ mL, 20% alcohol = $30 \times 10 = 300$ mL

Alligation alternate worked out — the cross method

- Worked logic: 70% and 20% $\rightarrow$ 40%. Parts of 70% = $40 - 20 = 20$ parts; parts of 20% = $70 - 40 = 30$ parts; total 50 parts. For 500 mL: 1 part = 10 mL $\rightarrow$ 200 mL of 70% + 300 mL of 20%.

Remember: Draw the cross in the exam even if you're sure of the arithmetic — method marks survive calculation slips.

Proof spirit

Proof spirit = the reference standard for alcohol strength: 57.1% v/v ethanol (at 15.56 °C). 100° proof = proof spirit itself.

- Over proof (O.P.): stronger than proof spirit — 25° O.P. = 125° proof.
- Under proof (U.P.): weaker — 25° U.P. = 75° proof.
- Conversion: % v/v ethanol = $(\text{proof} \div 100) \times 57.1$. So 70° proof = $39.97\% \approx 40\%$ v/v.

Isotonic solutions

Isotonic = same osmotic pressure as body fluids (tears, plasma) — equivalent to 0.9% w/v NaCl. Eye drops and injections must be isotonic, else pain, irritation or haemolysis.

- NaCl equivalent (E value) method: $E = \text{NaCl producing the same osmotic effect as 1 g of drug}$. $\text{NaCl to add} = 0.9 - (E \times \text{drug per 100 mL})$.
- Freezing-point depression method: plasma freezes at $-0.52\text{ }^{\circ}\text{C}$ — adjust the solution to the same freezing point.

Dilute solutions — percentage and ratio

- % w/w — g solute per 100 g solution (ointments, e.g., 5% w/w).
- % w/v — g solute per 100 mL solution (most liquids, e.g., 0.9% w/v NaCl).
- % v/v — mL solute per 100 mL solution (alcohol).
- Ratio strength — $1:1000 = 1\text{ g in } 1000\text{ mL} = 0.1\% \text{ w/v}$. Convert: $\% = (1 \div \text{ratio}) \times 100$.

Geometric dilution

Mixing a tiny quantity of potent drug into a large powder mass: mix drug with an approximately equal volume of diluent, then double the diluent stepwise until all is incorporated. Mortar + trituration. Same principle when working potent drugs into ointment bases.

Remember: Geometric dilution exists so a few mg of drug don't sit in one corner of a kilogram of powder — uniformity of potent doses.

Posology

Posology (Greek posos = how much + logos = study) = the study of doses: determining the right dose for the patient.

Formula	Based on	Equation
Young's	Age (children)	$[\text{Age} \div (\text{Age} + 12)] \times \text{adult dose}$
Dilling's	Age	$(\text{Age} \div 20) \times \text{adult dose}$
Clark's	Body weight	$(\text{Weight lb} \div 150) \text{ or } (\text{Weight kg} \div 70) \times \text{adult dose}$
Fried's rule	Age in months (infants)	$(\text{Months} \div 150) \times \text{adult dose}$
Body surface area	BSA (m^2)	$(\text{BSA} \div 1.73) \times \text{adult dose}$

- BSA is the most accurate — it tracks metabolic rate best. Mosteller: $\text{BSA} = \sqrt{[\text{height}(\text{cm}) \times \text{weight}(\text{kg}) \div 3600]}$.

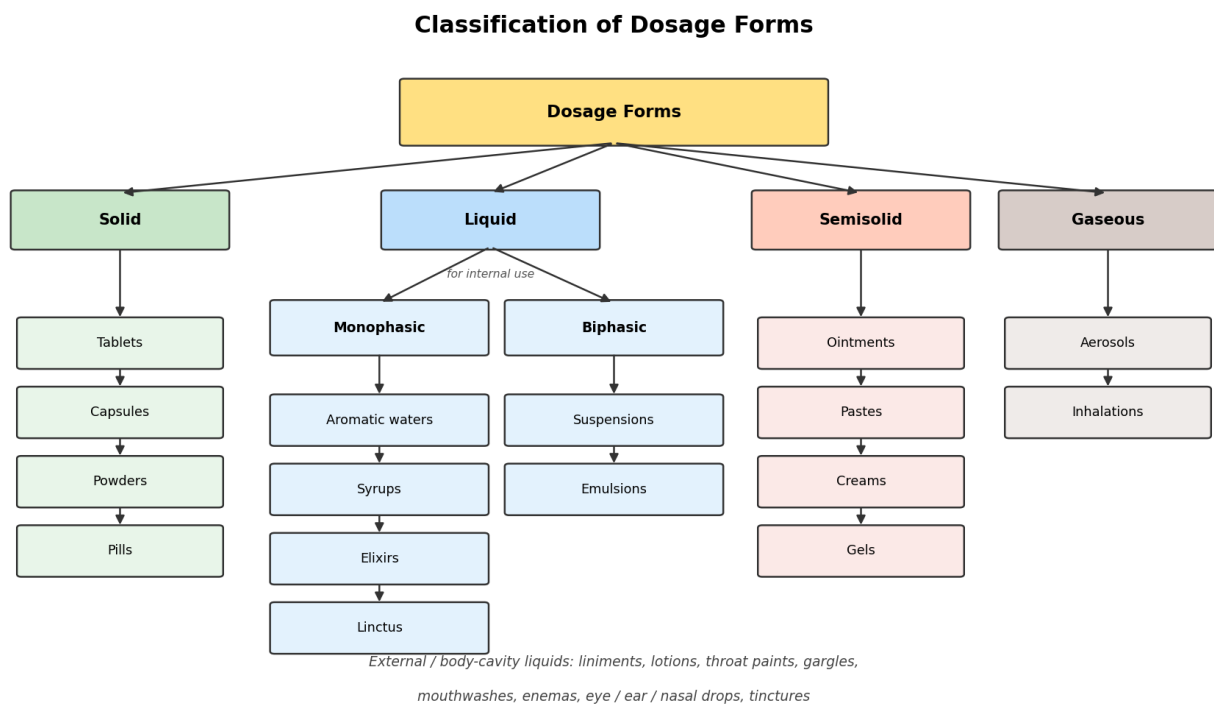
- Worked: adult 500 mg, 6-yr-old $\rightarrow 6/(6+12) \times 500 = 166.7$ mg.

Remember: In a numerical, name the formula first, then solve. The formula's name carries marks.

Introduction to Dosage Forms — routes of administration and classification

A dosage form is the physical form a drug is presented in (tablet, syrup, injection...). The route decides speed and site of action:

- Oral — convenient, but slow onset + first-pass metabolism. Sublingual/buccal — under tongue/cheek, fast, avoids first-pass (nitroglycerin). Parenteral — IV (fastest), IM, SC, intrathecal; sterile, when oral is impossible. Rectal — suppositories/enemas; for vomiting or unconscious patients and children. Topical — skin. Inhalation — direct to lungs (asthma). Nasal, ophthalmic, otic — nose/eye/ear drops. Transdermal — patches, slow release through skin.



Classification of dosage forms by physical state

- By physical state: solid (tablets, capsules, powders, pills), liquid — monophasic (waters, syrups, elixirs, linctus) and biphasic (suspensions, emulsions), semisolid (ointments, creams, pastes, gels), gaseous (aerosols, inhalations). Also classified by route or by release (immediate / sustained / controlled).

Active Pharmaceutical Ingredients and Excipients

- API = the substance producing the therapeutic effect (paracetamol in Crocin).
- Excipient = everything other than the API that helps manufacture, stabilise or present the medicine (starch as binder, lactose as diluent, colourants, flavourants).
- Ideal excipient: inert (no reaction with drug), non-toxic, stable, compatible with API and packaging, economical.
- Importance: without excipients there is no tablet that holds together, no syrup that pours and tastes acceptable, no suspension that stays uniform — excipients turn a good drug into a usable medicine.

Remember: API = effect; excipient = enabler. "Define API and excipient + ideal characteristics" is a favourite 5-marker.

Very short questions (2 marks)

- 1 Define posology.
- 2 What is proof spirit?
- 3 Convert 1:1000 ratio strength to percentage strength.
- 4 Define isotonic solution.
- 5 What is geometric dilution?

Short questions (5 marks)

- 1 Describe the alligation alternate method with a worked example.
- 2 Write short notes on Young's formula and Clark's formula for child dose calculation.
- 3 Define API and excipient. What are the ideal characteristics of excipients?

Long questions (10 marks)

- 1 Describe the methods of adjusting tonicity of pharmaceutical solutions.
- 2 Classify dosage forms with examples, and describe the routes of administration.

How to approach these answers

- Very-short Q1: definition + Greek root in one line.
- Very-short Q2: 57.1% v/v ethanol at 15.56 °C = 100° proof; one line.
- Very-short Q3: show the conversion $(1 \div 1000) \times 100 = 0.1\% \text{ w/v}$.
- Very-short Q4: same osmotic pressure as body fluids $\approx 0.9\% \text{ NaCl}$; one line.
- Very-short Q5: definition — equal-volume stepwise doubling of diluent; one line.
- Short Q1: state the rule (D–L, H–D), draw the cross diagram, solve the 70/20→40 example, one-line check.

- Short Q2: give each formula's equation + what it is based on (age vs weight); end with one line that BSA is most accurate.
- Short Q3: two definitions first, then the five ideal characteristics as points, one closing line on importance.
- Long Q1: intro (why tonicity matters — eye drops/injections), body under 2 subheads (NaCl equivalent method with formula; freezing-point method with $-0.52\text{ }^{\circ}\text{C}$), one-line conclusion.
- Long Q2: intro (dosage form definition), body under 3 subheads — classification by state (use the tree), routes of administration with one example each — conclusion linking route to onset.

Unit III — Solid Dosage Forms

Tablets and capsules are the majority of everything you will ever dispense. "Advantages and disadvantages" comparisons are near-certain questions — learn them as paired lists.

Powders

Powders = one or more drugs in a dry, finely divided state. Oldest dosage form family; still used where tablets can't go — very large doses, external dusting, drugs unstable in liquid.

Classification (one example each)

- Bulk powders — patient measures the dose (antacid powder). Divided powders — individually wrapped doses (ORS sachets). Dusting powders — external; medical (medicated, e.g., zinc oxide + starch) and surgical (sterile, for wounds); must be very finely sifted.
- Effervescent powders — sodium bicarbonate + citric/tartaric acid; release CO_2 in water (ENO) — fizz masks taste, speeds absorption.
- Efflorescent powders — drugs that lose water of crystallisation in air and go damp; pre-dry gently, pack airtight.
- Hygroscopic powders — absorb moisture and cake; airtight packing, sometimes a desiccant sachet.
- Eutectic mixtures — two solids (classic: menthol + camphor) whose mixture melts below room temperature and liquefies; triturate each separately with an inert absorbent (light magnesium oxide) before combining, or dispense separately.

Remember: Effervescent = fizz (wants water); efflorescent = damp (loses water).
Examiners pair them precisely because the names confuse.

Advantages: suit large doses; fast dissolution/absorption; easy to compound; good externally.
Disadvantages: bitter taste exposed; caking; bulky to carry; patient-measured doses are

inaccurate.

Excipients & preparation (intro): diluents (lactose, starch) bulk up small drug quantities; preparation by trituration in a mortar, then sifting and packing.

Tablets

A tablet = drug (with or without excipients) compressed into a flat or biconvex disc.

Types (with examples)

- Compressed — the ordinary tablet (paracetamol/Crocin). Sugar-coated — masks bitter taste (older vitamin tablets). Film-coated — thin polymer coat. Enteric-coated — resists stomach acid, dissolves in intestine; for drugs destroyed by acid or irritating the stomach (omeprazole, diclofenac).
- Chewable — chewed first (Digene, children's tablets). Sublingual/buccal — dissolve under tongue/cheek for rapid action (sorbitrate). Effervescent — fizz in water (vitamin C). Dispersible — disperse in water before use. Sustained/controlled-release — slow release over hours (metformin SR).
- Moulded tablets (tablet triturates) — made by moulding moist powder, not compression; small, fast-dissolving (nitroglycerin). Largely obsolete — still asked.
- Pills — small spherical masses made by rolling; the traditional form tablets replaced. Know the definition.

Remember: Enteric coating protects both ways — the stomach from the drug, and the drug from stomach acid. One line that completes any enteric answer.

Advantages: accurate dosing, convenient, stable, portable, taste-masking by coating, cheap to mass-produce. Disadvantages: slower onset than liquids; hard to swallow for children/elderly; unsuitable for compression-unstable drugs or very large doses.

Excipients & preparation (intro): diluents (lactose, starch), binders (starch paste, PVP), disintegrants (croscarmellose), lubricants (magnesium stearate, talc), glidants. Made by wet granulation, dry granulation, or direct compression, then compressed on a tablet machine.

Capsules

A capsule = drug enclosed in a gelatin shell.

Types

- Hard gelatin capsules — two-piece (body + cap), filled with powders/granules (amoxicillin, omeprazole). The common capsule.
- Soft gelatin capsules — one-piece sealed shell, filled with liquids/semi-solids (vitamin E Evion, cod liver oil).

Mnemonic: Capsule sizes 000, 00, 0, 1, 2, 3, 4, 5 — "more zeros, more room": 000 is largest, 5 is smallest, 0 is the commonest.

Advantages: tasteless shell hides bitter drugs; elegant; fast disintegration; soft shells carry liquids; accurate dosing. Disadvantages: unsuitable for very hygroscopic drugs (gelatin absorbs moisture) or large doses; gelatin is animal-derived; costlier than tablets.

Excipients & preparation (intro): diluents (lactose), lubricants/glidants for filling; hard capsules filled on capsule-filling machines (hand to automatic), soft capsules by the rotary-die process.

Very short questions (2 marks)

- 1 What is a eutectic mixture? Give one example.
- 2 Which capsule size is the largest, and which is most commonly used?
- 3 What are moulded tablets?
- 4 Define tablet.
- 5 Name the two types of dusting powders.

Short questions (5 marks)

- 1 Differentiate between effervescent and efflorescent powders.
- 2 Write the advantages and disadvantages of tablets.
- 3 Write a short note on types of capsules, including capsule sizes.

Long questions (10 marks)

- 1 Classify powders with examples. Describe the advantages, disadvantages and general method of preparation of powders.
- 2 Define tablets. Describe the types of tablets with examples, and their advantages and disadvantages.

How to approach these answers

- Very-short Q1: definition (two solids, melting point drops, liquefies) + example (menthol + camphor).
- Very-short Q2: 000 largest, 0 commonest; add the "more zeros, more room" line.
- Very-short Q3: made by moulding (not compression) + example; one line.
- Very-short Q4: textbook definition — compressed solid dosage form; one line.
- Very-short Q5: medical and surgical dusting powders; one line.
- Short Q1: two short paragraphs — effervescent fizzes (CO₂, wants water) vs efflorescent dampens (loses water of crystallisation); close with the packing difference.
- Short Q2: paired bullet lists, 5 advantages + 4 disadvantages; keep them parallel.
- Short Q3: hard vs soft gelatin (contents differ), then the size series with the mnemonic.

- Long Q1: intro (powder definition), body under 3 subheads — classification with examples, advantages/disadvantages, special types (eutectic, effervescent, efflorescent) with handling — one-line conclusion.
- Long Q2: intro (definition), body under 3 subheads — types with examples (enteric, chewable, sublingual, SR, moulded, pills), advantages/disadvantages as paired lists — conclusion on why tablets dominate.

Unit IV — Monophasic and Biphasic Liquids

The longest unit in BP102T. Learn each preparation as definition → example → one preparation point. The examples are what make your answer read like a pharmacy student's.

Monophasic liquids for internal use

Aromatic waters — clear aqueous solutions of volatile oils/aromatics, used as flavouring vehicles (chloroform water, peppermint water, rose water, camphor water). Prepared by shaking the aromatic with purified water and filtering; store well-closed, protected from light.

Syrups — concentrated aqueous solutions of sucrose. Simple syrup IP = 66.7% w/w sucrose — the sugar itself preserves (high osmotic pressure stops microbes). Sweet vehicles for bitter drugs (cough syrups); prepared by dissolving sucrose in purified water with heat.

Elixirs — clear, sweetened hydroalcoholic liquids (phenobarbitone elixir). Alcohol (5–40%) dissolves both water- and alcohol-soluble drugs and preserves — but limits use in children.

Linctus — viscous, sweet liquids taken in small doses, sipped slowly for cough (codeine linctus); not diluted with water — the drug must stay in contact with the throat mucosa.

Remember: Internal monophasics are just four — waters, syrups, elixirs, linctus. Everything else in this unit's list is external or body-cavity. That split is your answer skeleton for any "classify" question.

Monophasic liquids for external use and body cavities

- Liniments — rubbed onto skin with friction, alcoholic or oily (turpentine liniment); "external use only", "shake well".
- Lotions — dabbed on without friction, aqueous, cooling/soothing (calamine lotion).
- Throat paints — viscous liquids brushed onto the throat. Applications — older term for liquids/semi-liquids applied to skin (know it as a historical category).
- Gargles — treat the throat, gargled and spat out (Betadine gargle). Mouthwashes — cleanse/deodorise the mouth (chlorhexidine mouthwash).
- Enemas — administered rectally (evacuation or drug retention).

- Eye drops — sterile, isotonic and buffered (ties back to Unit II). Ear drops — into the ear (wax-softening). Nasal drops — into the nose (decongestants).
- Tinctures — alcoholic/hydroalcoholic extracts of crude drugs (tincture of iodine); prepared by maceration or percolation.

Mnemonic: Liniment = rubbed (friction), lotion = dabbed (no friction). Gargle = throat, mouthwash = mouth. Exam gold.

Official preparations — excipients and methods (intro)

Official = listed in the pharmacopoeia. Excipients: vehicles (purified water, alcohol, glycerin), sweeteners (sucrose, sorbitol), preservatives (benzoates, parabens), flavours, colours. General methods: solution (dissolve with stirring/heat), maceration and percolation (tinctures/extracts), then filtration and clarification.

Suspensions — biphasic liquids

A suspension = finely divided solid particles dispersed in a liquid vehicle. "Shake well before use" exists because the drug settles.

Flocculated vs deflocculated

- Flocculated — particles form loose flocs; settle fast but sediment is fluffy and redisperses easily; no caking. Preferred.
- Deflocculated — particles stay individual; settle slowly but pack into a hard cake, difficult to redisperse. The problem formulators avoid.

Remember: Flocculated = fast settle, easy shake-back (good). Deflocculated = slow settle, hard cake (bad). One sentence each.

Advantages: suits insoluble/unstable-in-solution drugs; masks taste better than solutions; higher drug loading; prolonged action possible. Disadvantages: physical instability (settling, caking); dose uniformity depends on shaking; bulky.

Formulation excipients: suspending/viscosity agents (tragacanth, bentonite, sodium CMC), wetting agents (surfactants) for hydrophobic particles, flocculating agents (electrolytes), sweeteners, flavours, preservatives.

General method: triturate drug with wetting agent → add suspending agent (as mucilage) → incorporate vehicle gradually → make up to volume → label "shake well before use".

Emulsions — biphasic liquids

An emulsion = one liquid dispersed as fine droplets in another immiscible liquid, stabilised by an emulsifying agent.

Types

- o/w (oil-in-water) — oil droplets in water (cod-liver-oil emulsion); washable, preferred internally.
- w/o (water-in-oil) — water droplets in oil (cold-cream type); greasy, external.

Emulsifying agents: natural (acacia, tragacanth, gelatin, egg yolk); synthetic non-ionics — Tweens (hydrophilic → o/w) and Spans (lipophilic → w/o); finely divided solids (bentonite).

Tests for identification of emulsion type (learn all four)

- 1 Dilution test — o/w dilutes freely with water; w/o does not (dilutes with oil).
- 2 Dye test — water-soluble dye colours the continuous phase: uniform = o/w, spotted = w/o (reverse with oil-soluble dye).
- 3 Conductivity test — o/w conducts electricity (water continuous); w/o does not.
- 4 Fluorescence test — under UV: o/w spotty, w/o uniform (oils fluoresce).

Mnemonic: D-D-C-F — "Doctors Detect Cream Fast": Dilution, Dye, Conductivity, Fluorescence.

Formulation excipients: emulsifying agents (above), preservatives, antioxidants, flavours/sweeteners for oral emulsions.

General methods: dry gum (continental) — acacia + oil triturated first, then water added at once to form the primary emulsion; wet gum (English) — acacia + water mucilage first, oil added gradually; bottle method — for volatile oils, shaken in a bottle.

Very short questions (2 marks)

- 1 What is the sucrose content of simple syrup IP?
- 2 Differentiate between a liniment and a lotion.
- 3 Name the four tests used to identify the type of an emulsion.
- 4 Define suspension.
- 5 What is the difference between a gargle and a mouthwash?

Short questions (5 marks)

- 1 Differentiate between flocculated and deflocculated suspensions.
- 2 Write short notes on aromatic waters and linctus.
- 3 Describe the dry gum and wet gum methods of emulsion preparation.

Long questions (10 marks)

- 1 Define emulsion. Describe its types, emulsifying agents, and the tests used to identify emulsion types.
- 2 Classify monophasic liquid dosage forms with examples. Describe the preparation of syrups, elixirs and tinctures.

How to approach these answers

- Very-short Q1: one figure — 66.7% w/w sucrose; one line.
- Very-short Q2: rubbed with friction vs dabbed without; one line each with examples.
- Very-short Q3: list the four tests (D-D-C-F) with the mnemonic.
- Very-short Q4: definition only — solid particles dispersed in liquid vehicle.
- Very-short Q5: throat (gargled, spat out) vs mouth (cleansed); one line.
- Short Q1: two-column style — settling speed, sediment character, redispersibility; close with "flocculated preferred".
- Short Q2: each gets definition + example + one preparation point; 3–4 lines each.
- Short Q3: dry gum (continental: oil + acacia first) vs wet gum (English: mucilage first); steps in order.
- Long Q1: intro (definition), body under 3 subheads — types with examples, emulsifying agents (natural/synthetic/Spans-Tweens), four identification tests — conclusion on why type matters.
- Long Q2: intro (monophasic = one phase), body under 3 subheads — internal vs external classification with examples, syrup prep, elixir + tincture prep (maceration/percolation) — one-line conclusion.

Unit V — Semisolid Dosage Forms

Semisolids stay where you put them on skin or mucosa but spread under pressure. Two heavy topics: ointment bases (four types) and displacement value. Both are repeat questions.

Semisolid dosage forms — definitions and classification

Semisolids = preparations that adhere to skin or mucous membrane without flowing.

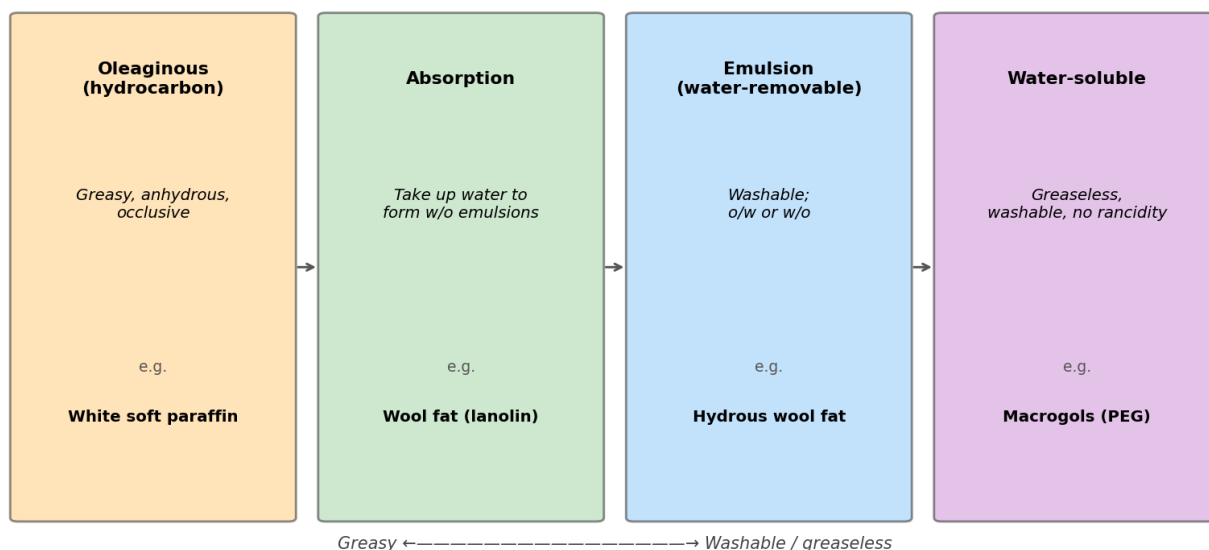
- Ointments — greasy medicated semisolids in a base (sulphur ointment).
- Pastes — stiffer than ointments; high insoluble-powder content (20–50%) — less greasy, more protective, stay in place (zinc oxide paste).
- Creams — semisolid emulsions: o/w (vanishing creams — washable, non-greasy) or w/o (cold creams — greasy, emollient).
- Gels (jellies) — transparent/translucent; liquid thickened by a gelling agent (carbopol-based diclofenac gel).

Advantages: direct local action; avoid first-pass; easy to apply; good for skin disease.
Disadvantages: greasy/messy; inaccurate dosing; poor acceptability on weeping wounds; rancidity of fatty bases.

Ointment bases and other excipients

The base decides the ointment's behaviour — drug release, greasiness, washability.

Ointment Bases — Four Types Compared



Four types of ointment bases compared

Base type	Character	Example
Oleaginous (hydrocarbon)	Greasy, anhydrous, occlusive	White soft paraffin
Absorption	Take up water, form w/o emulsions	Wool fat (lanolin)
Emulsion (water-removable)	Washable; o/w or w/o	Hydrous wool fat
Water-soluble	Greaseless, washable, no rancidity	Macrogols (PEG ointment)

Other excipients: preservatives (parabens), antioxidants (fatty bases), humectants (glycerin), stiffening agents (waxes), plus the medicament.

General methods of preparation

- 1 Trituration method — for insoluble powders: powder the drug finely, triturate with a small portion of base on an ointment slab, then geometrically dilute with the rest.
- 2 Fusion method — for waxy bases: melt base ingredients in decreasing order of melting point, add the drug, stir while cooling to avoid grittiness.

Remember: The four bases in order — oleaginous → absorption → emulsion → water-soluble — run from most greasy to most washable. One example each is exam gold.

Suppositories and Pessaries

A suppository = solid dosage form for rectal administration that melts, softens or dissolves at body temperature to release the drug. Pessaries = vaginal equivalent (larger, ovoid). Bougies = thin, pencil-shaped urethral suppositories.

Types: rectal (torpedo/cone, ~1–2 g), vaginal/pessaries (larger, ovoid), urethral bougies (thin).

Advantages: for patients who can't swallow (vomiting, unconsciousness, children); local rectal action (piles, constipation — glycerin suppositories); partly bypasses first-pass (lower rectum drains systemically). Disadvantages: low patient acceptability; incomplete/irregular absorption; melt in hot climates during storage.

Ideal suppository base — properties

- Melts at body temperature (or dissolves in body fluids); releases drug promptly.
- Non-toxic, non-irritant, stable, compatible with the drug.
- Contracts slightly on cooling — releases easily from the mould.
- Good emulsifying / water-absorbing capacity where needed.

Types of suppository bases

- Oleaginous: cocoa butter (theobroma oil) — classic; melts at body temperature (~34–35 °C); but goes rancid and has polymorphism problems in heat.
- Water-soluble/miscible: glycerogelatin (vaginal use, dissolves slowly) and macrogols/PEG bases (heat-stable, no rancidity, but hygroscopic).

Displacement value

The drug occupies space in the mould, so less base is needed. Displacement value = the quantity of drug that displaces 1 g of the base.

- **Base required = (mould capacity × number of suppositories) – (drug quantity ÷ displacement value)**

Remember: Learn the displacement-value definition word-for-word — it is a 2-mark favourite, and the numerical is a 5-mark favourite. Both hinge on this one line.

General method of preparation

Fusion/moulding: melt the base → incorporate the drug (dissolved or suspended, with stirring) → pour into cooled, lubricated moulds → set, trim, pack. (Older alternative: cold compression / hand-rolling.)

Very short questions (2 marks)

- 1 Define displacement value.
- 2 Name the four types of ointment bases.
- 3 What is the difference between a suppository and a pessary?

- 4 Define semisolid dosage form.
- 5 Give one example each of an oleaginous base and a water-soluble suppository base.

Short questions (5 marks)

- 1 Classify ointment bases with one example each.
- 2 Describe the properties of an ideal suppository base.
- 3 Write short notes on creams and pastes.

Long questions (10 marks)

- 1 Define suppositories. Describe their types, advantages and disadvantages, types of suppository bases, and the concept of displacement value.
- 2 Classify semisolid dosage forms. Describe the general methods of preparation of ointments.

How to approach these answers

- Very-short Q1: the exact one-line definition (quantity of drug displacing 1 g of base).
- Very-short Q2: list the four names with one example each; two lines max.
- Very-short Q3: rectal vs vaginal (+ bougie = urethral); one line.
- Very-short Q4: definition — adheres to skin/mucosa without flowing; one line.
- Very-short Q5: white soft paraffin / cocoa butter; macrogol or glycerol-gelatin; one line.
- Short Q1: reproduce the four-row table (type, character, example); no extra story.
- Short Q2: four properties as points — melting, safety, mould release, water uptake.
- Short Q3: cream = semisolid emulsion (o/w vanishing, w/o cold) vs paste = stiff, 20–50% powder; contrast in pairs.
- Long Q1: intro (definition), body under 3 subheads — types + advantages/disadvantages, base types with examples, displacement value (definition + formula + one-line use) — conclusion on when suppositories are chosen.
- Long Q2: intro (semisolid definition), body under 3 subheads — classification with examples, ointment bases table, preparation methods (trituration vs fusion, steps in order) — conclusion on base selection.