Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions etc.

PHARMACEUTICAL CALCULATIONS

- In pharmacy, *accuracy in weighing and measuring* is crucial for safe drug preparation and dispensing.
- Incorrect weight/volume may lead to **under dose or overdose** → serious therapeutic failure or toxicity.
- Hence, pharmacists must know **systems of weights and measures** used in pharmacy.

2. Importance of Weights & Measures in Pharmacy

1. To maintain **accuracy** in prescription filling and compounding.
2. To avoid **medication errors** caused by incorrect dose calculation.
3. To ensure **quality control** in drug manufacturing.
4. To help in **interconversion** of systems (older prescriptions may use grains, drams, etc.).
5. To enable **patient compliance** by using simple household measures when required.

Systems of Weights and Measures

1. Metric System (SI System – International System of Units)

- Widely used in pharmacy, medicine, and science.
- Based on **decimal system** (multiples of 10).
- **Basic units:**
  - Length → *metre (m)*
  - Weight → *gram (g)*
  - Volume → *litre (L)*
- **Common prefixes:**
  - kilo (k) = 1000
  - centi (c) = 1/100
  - milli (m) = 1/1000
  - micro (µ) = 1/1,000,000

☞ **Examples in pharmacy:**

- 1 kg = 1000 g
- 1 g = 1000 mg
- 1 mg = 1000 µg
- 1 L = 1000 mL

2. Imperial / British System

- Old system, still found in prescriptions (but mostly outdated).
- Units:
  - Weight → grain (gr), ounce (oz), pound (lb)
  - Volume → fluid ounce (fl oz), pint, gallon

☞ **Conversions:**

- 1 grain = 64.8 mg
- 1 ounce = 28.35 g
- 1 pound = 454 g
- 1 fluid ounce = 28.4 mL

Apothecaries' System (Historical use in pharmacy)

- Traditional system used by pharmacists.
- Units based on *grains* for weight and *minims* for liquid.

☞ **Weight Units:**

- 1 scruple = 20 grains (~1.3 g)
- 1 dram = 3 scruples = 60 grains (~3.9 g)
- 1 ounce = 8 drams (~28.35 g)

☞ **Liquid Units:**

- 1 minim = 1/60 fluid dram (~0.06 mL)
- 1 fluid dram = 60 minims (~3.55 mL)
- 1 fluid ounce = 8 fluid drams (~29.6 mL)

(Rarely used now, but important for historical context in pharmacy exams.)

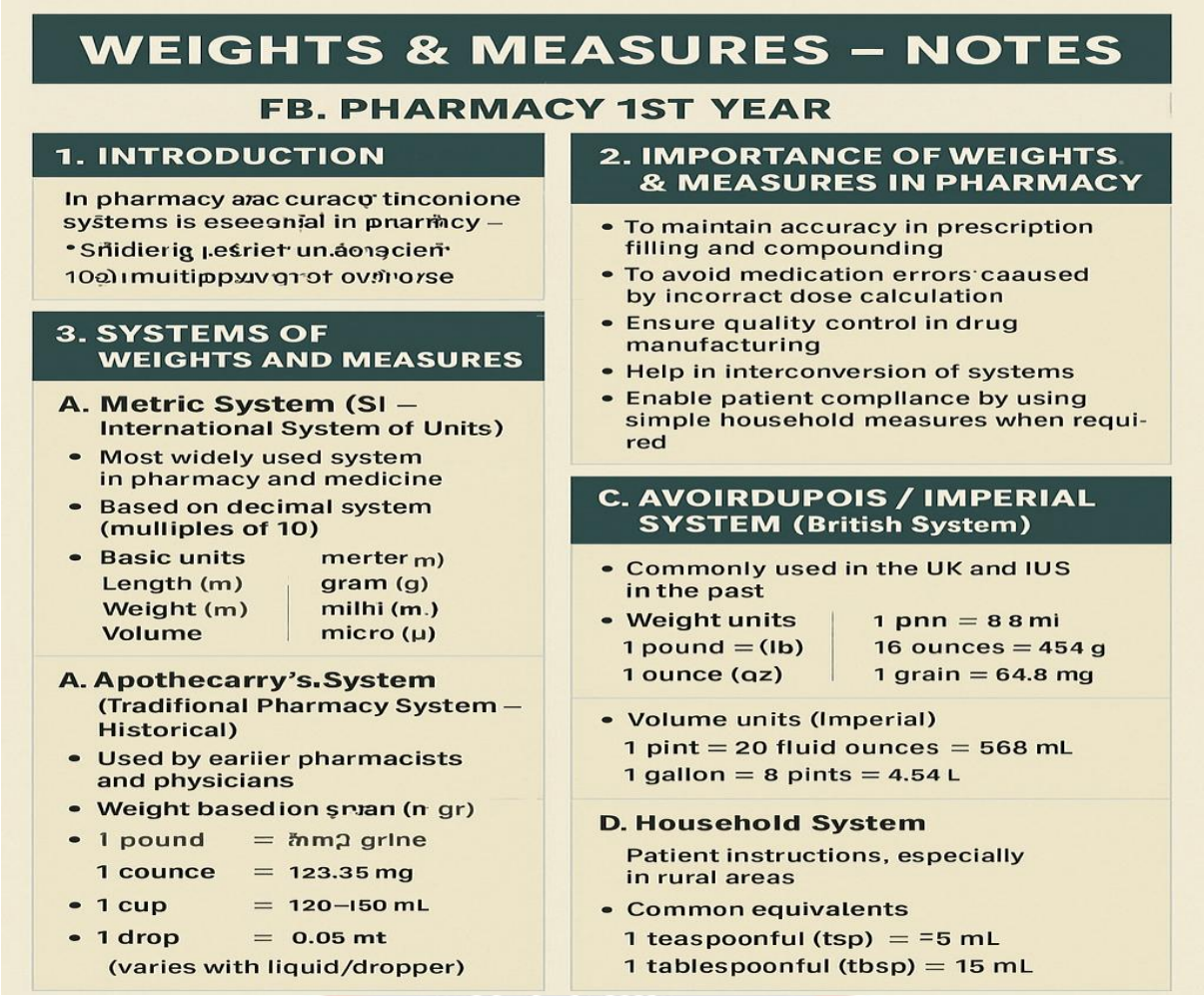
4. Household System

- Common in patient instructions (especially in rural or home settings).
- Units: teaspoonful, tablespoonful, cup, drop, etc.

  ☞ Approximate measures:
- 1 teaspoonful ≈ 5 mL
- 1 tablespoonful ≈ 15 mL
- 1 cup ≈ 120–150 mL
- 1 drop ≈ 0.05 mL (varies with liquid & dropper).

Pharmacy-Specific Units

- **International Units (IU):**
  Used for vitamins, hormones, enzymes, e.g., Vitamin D, insulin.
- **Milliequivalents (mEq):**
  Used in electrolytes (Na^+, K^+, Ca^{2+}).



WEIGHTS & MEASURES – NOTES

FB. PHARMACY 1ST YEAR

1. INTRODUCTION

In pharmacy arac curacy tinconione systems is eseeonial in pnarmacy –

- Snidierig i.e$riet un.áoıacien
- 10ɑ) ımuitippyvgt-ot ovmorse

3. SYSTEMS OF WEIGHTS AND MEASURES

A. Metric System (SI – International System of Units)

- Most widely used system in pharmacy and medicine
- Based on decimal system (mulliples of 10)
- Basic units

Length (m)	merter m)
Weight (m)	gram (g)
Volume	milhi (m.)
	micro (µ)

A. Apothecarry's.System (Tradifional Pharmacy System – Historical)

- Used by eariier pharmacists and physicians
- Weight basedion şnan (n gr)
- 1 pound = ămɑ grine
  1 counce = 123.35 mg
- 1 cup = 120–150 mL
- 1 drop = 0.05 mt
  (varies with liquid/dropper)

2. IMPORTANCE OF WEIGHTS & MEASURES IN PHARMACY

- To maintain accuracy in prescription filling and compounding
- To avoid medication errors caaused by incorract dose calculation
- Ensure quality control in drug manufacturing
- Help in interconversion of systems
- Enable patient compllance by using simple household measures when required

C. AVOIRDUPOIS / IMPERIAL SYSTEM (British System)

- Commonly used in the UK and IUS in the past
- Weight units

1 pound = (lb)	1 pnn = 8 8 mi
1 ounce (ɑz)	16 ounces = 454 g
	1 grain = 64.8 mg

- Volume units (Imperial)
  1 pint = 20 fluid ounces = 568 mL
  1 gallon = 8 pints = 4.54 L

D. Household System

Patient instructions, especially in rural areas

- Common equivalents
  1 teaspoonful (tsp) = =5 mL
  1 tablespoonful (tbsp) = 15 mL