Prescription

Total amount	= 500 ml
95% alcohol	= 154 ml
30% alcohol	= 346  ml

**Example :** In what proportion should we mix 50%, 20% and 5% zinc oxide to produce 10% ointment?

## Solution :

- 1. Write the percentage strength in descending order on the L.H.S. of vertical line and required percentage in between the two vertical lines.
- 2. Two lots containing more (50% and 20%) than the desired percentage may be separately linked to the lot containing less (5%) than the desired percentages.
- 3. Subtract the required strength from the higher strength and write the values horizontally against the lowest strength on R.H.S.
- 4. The sum of two values indicates the parts of the lowest strength required.
- 5. Subtract the lowest strength from the required strength and put the remainder on the right hand side.

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	5 parts 5 parts 10 + 4	of 50% of 20% 0 = 50 j	b ointm b ointm parts of	ent ent 5% ointme	ent,
Relative amounts	5 : 5	5:50	or 1:	1:10	
50	x	1	=	50	
20	×	1	=	20	
5	x	10	=	50	

Percentage of zinc oxide 
$$=\frac{120}{12} = 10\%$$

Total :

**Example :** How many parts of 20%, 15%, 5% and 3% alcohol should be mixed to get 10% ointment?

12

120

Solution :

20%		7 parts of 20% ointment
- 15%	10	5 parts of 15% ointment
- 5%	10	5 parts of 5% ointment
		10 parts of 3% ointment

.

## Powders

## 1. Divided powders

They are of two types :

- (i) Simple powders
- (ii) Compound powders.

## (i) Simple powders

A simple powder contains only one ingredient either in crystalline or amorphous form. When the powder is in the crystalline form, then it should be reduced to fine powder, weighed and wrapped as individual doses.

## (ii) Compound powders

Compound powder contains two or more than two substances which are mixed together and then divided into individual doses.

## Method of preparation

- 1. Separately powder a slight excess of each crystalline substance.
- 2. Weigh out the required amount of each powder and diluent, i.e., lactose, if necessary.
- 3. Triturate all the ingredients in ascending order of their weights thoroughly so that a homogenous powder is formed.
- 4. Weigh out the required number of powders and wrap them in the papers.
- 5. If the powder is of volatile nature or hygroscopic substance, then double wrapping should be done in which the inner paper should be of wax paper to prevent volatilization and absorption of moisture.

# 2. Bulk powders

Powders supplied in bulk quantities are applied by the patient according to his need. They are preferably supplied in perforated or sifter type containers.

- (i) Dusting powders
  - (a) Dusting powders are meant for external application to the skin for antiseptic, antipruritic, astringent, absorbent, protective and antiperspirant purposes.
  - (b) Dusting powders should flow easily and should be able to protect the skin from irritation caused by friction, moisture or chemical irritants. These powders must be in a very fine state of subdivision

# Biphasic Liquid Dosage Form

#### Suspensions

Suspensions are the biphasic liquid dosage form of the medicament meant for oral administration, external application and for parenteral use. They generally consist of finely divided solid particles ranging from 0.5 to  $5.0 \mu$  suspended in a liquid or semi-solid vehicle.

The particle size of the disperse phase is an important consideration in the formulation process. The suspensions meant for topical application should have small particle size to avoid a gritty feel and to provide greater coverage of the area of application. If the solid substance is meant for skin penetration, its small size gives a faster rate of dissolution and therefore helps penetration. Injectable suspension should have a particle size that can pass through the needle. In suspensions meant for introduction into the ophthalmic cavity the particle size should not go beyond  $10 \,\mu$ . Suspension is an ideal dosage form for patients who cannot swallow tablets or capsules.

#### **Qualities of Good Suspension**

Suspension should have the following properties :

- 1. It should be chemically stable.
- 2. The sediment produced on standing should be easily redispersed.
- 3. The viscosity should be such that the preparation can be easily poured.
- 4. Suspensions meant for internal use must be palatable and suspensions for external use must be free from gritty particles.

## (i) Suspensions containing diffusible solids

Solids which are insoluble in water but readily mix with water and remain suspended throughout the liquid for sufficiently long time after shaking are known as diffusible solids.

Examples : CaCO<sub>3</sub>, light MgCO<sub>3</sub>, magnesium trisilicate, rhubarb powder and light kaolin.

- 2. It should be stable if heated above its melting point.
- 3. It should release the medicament readily.
- 4. It should be non-toxic and non-irritant.
- 5. It should be compatible with large number of drugs.
- 6. It should not stick to side of mould and should be easily mouldable.
- 7. It should remain stable on prolonged storage.
- 8. It should be good in appearance.

## 1. Oily bases

## (a) Theobroma oil or cocoa butter

It is a yellowish white solid obtained from crushed and roasted seeds of theobroma cocoa.

#### Properties

- (a) M.P.  $-30-35^{\circ}$ C.
- (b) Consistency butter-like.
- (c) Odour chocolate-like.
- (d) Composition mixture of glyceryl esters of stearic, palmitic, oleic and other fatty acids.
- (e) This base melts at body temperature and releases the medicament for rapid absorption. Cocoa butter is suitable for rectal suppositories but not for pessaries, bouginaria and urethral bougies because of its immiscibility with mucous secretions.

#### Disadvantages

(a) Polymorphism : It shows the phenomenon of polymorphism, i.e., when melted and cooled theobroma oil solidifies into different crystalline forms depending upon melting temperature, rate of cooling and size of mass.

Temperature of melting	After cooling
At 20°C	Alpha crystals
Not more than 36°C	Slow cooling forms stable beta crystals
Overheating	Unstable gamma crystals*

\* These unstable forms return to stable form after several days.

- (b) It has a tendency to stick to the sides of moulds when solidified.
- (c) It becomes rancid and melts in warm weather.

**Dental and Cosmetic Preparations** 

Quarternary ammonium compounds require non-ionic medium otherwise they will get inactivated by soaps and other ionic substances.

Efficacy of antiperspirants can be evaluated by following methods :

- 1. Staining method
- 2. Gravimetric method
- 3. Continuously recording method.

Efficacy of deodorants can be tested by an olfactory test of axillary odour. In this test product and control product are applied to axillae of test subjects.

Formulae :

Liquid antiperspirants		
Aluminium chlorohydrate	20	%
Propylene glycol	51%	%
Alcohol	0.2	%
Perfume q.s.		
Water up to	100	%
Cream antiperspirants		
Aluminium chlorohydrate	20%	
Glyceryl monostearate (soap free)	20%	
Spermaceti	5%	
Glycerine	3%	
Perfume q.s.	1. S. S.	
Water up to	100%	

#### Shampoos

Shampoos can be defined as solid, liquid or semi-solid preparations meant for cleansing action to remove soil and dust from hair without affecting natural gloss of hair.

Properties of shampoos

- 1. It should get easily removed by rinsing.
- 2. It should be capable of removing soil, excessive sebum and residues of setting lotions, etc.
- 3. It should provide a pleasant fragrance to the hair.
- 4. After shampooing it should leave the hair in soft and lustrous condition.
- 5. Shampoo should impart a sufficient degree of foam to satisfy the 'user'.
- 6. It should be non-toxic and non-irritant.