UNIT 1 INTRODUCTION TO PHARMACEUTICS

Structure

1.1 INTRODUCTION

Pharmaceutics is the area of study concerned with the formulation, manufacturing stability and effectiveness of pharmaceutical dosage form. In the previous unit various communicable, non-communicable disorders were described. In this unit we will study how the drugs are administered in the body to be effective. Drugs are rarely used alone. They are used as a part of a formulation with other non-drug substances. These non-drug substances or additives serve specific function. The drugs presented in the dosage form are given in a specific quantity i.e. dose for a specific period. These dosage forms are available in various forms as required for a specific disease condition. Packaging of dosage form is another important aspect as the dosage form should not degrade during storage. A good packaging is necessary to protect the drug component from any type of deterioration till it reaches the consumer.

In this unit, we will describe the prescription, methods to calculate the dose of drug, various types of dosage forms and packaging materials used for pharmaceuticals.

Objectives

After studying this unit, you should be able to:

- explain prescription and its various parts;

- describe various types of dosage form; and
- describe the need of packaging and various packaging materials used.

1.2 THE PRESCRIPTION

A prescription is a medication order written by a doctor, dentist or a veterinary surgeon for the supply of a medicine, dressing or a surgical instrument to a patient. A prescription contains the following parts.

i) Prescribers office information
ii) Information about patient or patient information
iii) Date
iv) Superscription or Symbol Rχ
v) Inscription
vi) Subscription
vii) Signature or Signa
viii) Prescriber's signature, and license No.
ix) Special labelling, refill and other instructions

Let us discuss each of these separately.

i) Prescribers Office Information

This part of the prescription is generally printed and it contains the name of the hospital, department and also the name of the prescriber.

ii) Patient Information

Patient information is necessary for identification purpose. Full name and address, age and sex of the patient must be written on the prescription. For a child, the age is very important as it helps in checking the dose of drug. If the patient's full name and address is not written on the prescription then pharmacist should ask the patient about these particular, to avoid any possibility of giving products to any other patient.

iii) Date

Date on the prescription is written by the prescriber when it is written and also when they are received and filled in the pharmacy. The date on the prescription helps a pharmacist to find out the time lapse between the time of writing the prescription and when it is brought for filling. In case of unusual time lapse the pharmacist can question if the intention of the prescriber on the need of the patient can still be met.

iv) Superscription or Rχ Symbol

The superscription is represented by symbol Rχ. R is an abbreviation for the Latin word recipe meaning take though and letter j is an invocation to

Jupiter, the God of healing so Rχ is combination of both meaning you take.

v) Inscription

This is the main part of the prescription. It contains the names and quantities of medicaments to be supplied. The medicaments may be prescribed as an official preparation or as a proprietary product together with the quantity required. The medicament may also be sometimes prescribed as a special formula in which the quantities of each ingredient is given together with the type of preparation e.g. a solution, emulsion or ointment etc. The prescriptions orders requiring the pharmacist to mix ingredients are known as compounded prescriptions.

vi) Subscription

This part of prescription consists of directions to the pharmacist for preparing the prescription. These may include the dosage form to be prepared and the number of doses to be dispensed. But now-a-days in majority of the prescriptions, the subscription serves merely to give directions about the dosage form and the number of doses to be supplied.

vii) Signature or Signa

This part of the prescription consists of directions for the patients. These directions are also to be placed on the label. It usually indicates the quantity of medicament or number of dosage units to be administered or applied. How much time in a day or what time to be administered or applied. The diluent if required or the means of application (e.g. brush).

viii) The Prescriber's Signature, License Number

The name and signature of prescriber authenticate the prescriptions and avoids danger of dispensing of a spurious prescription.

ix) Special labelling and other instructions

The number of refills should be indicated on each prescription by the prescriber.

1.3 POSOLOGY

Posology deals with the dose or quantity of drug which is administered to produce the therapeutic action.

Dose of a drug is the amount of a medicinal preparation or of radiation to be administered at one time.

Dosage

Determination of the amount, frequency and number of doses of medicine to be given to a particular patient.

1.3.1 Dosage Calculation for Children

Various rules for calculating infant's and children's dosages are used. All of these methods give approximate dosage. Children are sometimes more susceptible than adults to certain drugs.

The following rules are used for calculation of doses for infants and children.

1. **Young's Rule (for Children 2 to 12 years)**

$$\text{Child dose} = \frac{\text{Age in years}}{\text{Age in years} + 12} \times \text{Adult dose}$$

2. **Clark's Rule (for Children below 2 years)**

$$\text{Child's dose} = \frac{\text{Weight in pounds}}{150} \times \text{Adult dose}$$

3. **Fried's Rule for infants up to 2 years**

$$\text{Infant's dose} = \frac{\text{Age in months}}{150} \times \text{Adult dose}$$

4. **Dilling's Formula**

$$\text{Child's dose} = \frac{\text{Age in years} + 3}{30} \times \text{Adult dose}$$

5. **The square meter surface area method** is more reliable method of relating dosage. This method relates the surface area of individual to dose of drug.

$$\text{Child's dose} = \frac{\text{Body surface area of child}}{\text{Body surface area of adult}} \times \text{Adult dose}$$

The average body surface area for an adult is taken as 1.73 sq. meter (m^2). Hence,

$$\text{Child dose} = \frac{\text{Body surface area of child } (m^2)}{1.73} \times \text{Adult dose}$$

1.3.2 Calculation of Doses for Adults

Many physiological functions such as metabolic rate and kidney functions are proportional to body surface area. The dose for some drugs may be given as the amount of drug/m^2 body surface area. In such cases the dose for an individual may be calculated as follows:

$$\text{Individual's dose} = \text{Amount of drug/m}^2 \times \text{Body surface area in m}^2$$

Generally the drug doses are often given in mg/kg body weight and for individuals it may be calculated as follows:

$$\text{Individual's dose} = \text{mg/kg} \times \text{body weight in kg}$$

SAQ 1

What is prescription?

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SAQ 2

Calculate the dose of drug for a child of 5 years if the adult dose is 100 mg.

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1.4 DOSAGE FORMS

Drugs are rarely used in the form of pure chemical substance but are given in the formulated preparations i.e. dosage forms. The formulations vary from simple solutions to complex drug delivery system and prepared by using one or more non-drug additives or excipients that have specialized pharmaceutical function. These additives are used in dosage forms to solublize, suspend, thicken, preserve, emulsify, to improve the organoleptic properties and to improve the compressibility and to give an efficacious and appealing dosage form.

An **excipient** is an inactive substance used as a carrier for the active ingredients of a medication.

1.4.1 Need for Dosage Forms

Many of drug substances are administered in very small (milligram) quantities, which require these substance to be weighed on sensitive balance. Due to the low dosage and potent nature of the drugs cannot be taken by the patient by himself, when the dose of drug is minute e.g. 0.05 mg of drug, for some drugs. Solid dosage forms such as tablets and capsules must be prepared with fillers

or diluents so that the size of dosage form is large enough to be handled easily. Dosage forms are needed to:

i) provide a method for safe and convenient delivery of accurate dose of drug.

ii) protect the drug from destructive effect of atmospheric oxygen or moisture i.e. from oxidation, hydrolysis and reduction e.g. the tablet may be given coating.

iii) protect the drug from degradation by gastric acid after oral administration e.g. enteric coating may be given to tablets and capsules (enteric coating does not dissolve in acid but it will dissolve in alkaline pH).

iv) obscure the bitter, salty or offensive taste or odour of a drug e.g. drug may be given in capsules or in the form of flavoured syrups.

v) give the drugs (which are insoluble or unstable) in the form of liquid preparations e.g. suspensions.

vi) give the drugs in the clear liquid forms e.g. solution.

vii) obtain rate controlled and sustained release drug action e.g. controlled release tablets.

viii) obtain drug action from topical application e.g. creams, transdermal patch etc.

ix) obtain drug action by insertion into various body cavities e.g. suppositories.

x) obtain the drug action by placing the drug directly into bloodstream or in body tissues e.g. injections.

xi) obtain drug action through inhalation therapy e.g. inhalation aerosols.

1.4.2 Classification of Dosage Forms

Dosage forms may be classified in different way:

a) On the basis of physical form of the product
b) On the basis of the different administration routes

a) On the basis of physical form of the product

i) *Solid dosage forms*

The solid dosage forms are mostly unit dosage form and they are taken by number consist of single dose. Sometimes solid dosage forms are supplied in bulk. In Unit 2 you will study about the solid dosage form in detail.

ii) *Liquid dosage form*

The liquid dosage forms may be monophasic or biphasic liquid dosage form are for internal, external or parenteral use.

iii) *Semisolid dosage forms*

Semisolid dosage forms are mostly for external use having semisolid consistency.

b) On the basis of the different administration routes

i) *Orally administered dosage form*

Solutions, syrups, elixirs, suspensions, emulsions, gels, powders, granules, capsules, tablets

ii) *Parenteral*

Injections which may be in solution, suspension or emulsion form, implants, irrigation and dialysis solution.

iii) *Rectals route*

Suppositories, creams, ointments, powers and solutions.

iv) *Topical*

Ointment, creams, pastes, lotion, gels, solutions, aerosols.

v) *Lungs*

Aerosols, inhalations.

vi) *Nosal*

Solutions, inhalations.

vii) *Eye*

Solutions (lotions, eye drops), ointments.

viii) *Ear*

Solutions, suspensions and ointments.

1.4.3 Additives in Dosage Forms

The action of a dosage form and the form depends on the additives added. An additive is a non-drug component having a definite function to perform in a formulation.

The additives generally used in formulations are classified as

i) Vehicles
ii) Disintegrating agents
iii) Form givers
iv) Organoleptic additives (colouring, flavouring and sweetening)
v) Stabilizers
vi) Manufacturing additives

i) Vehicles

Vehicle is a term which can be used for any solid, semisolid or liquid material used in formulation for carrying a drug.

These additives form the bulk of a dosage form and help to give a desired dosage form.

Solvents are used to dissolve the drugs. These solvent may be aqueous or non-aqueous. For example:

Base – These are semisolid vehicles into which drug substance may be incorporated in the formulation of ointment, paste suppositories etc.

Diluents are the material added to increase the bulk or reduce the drug concentration.

ii) Disintegrating Agents

The dosage form once ingested must disintegrate into smaller particles to give its drug contents to the body. For example in tablets, disintegrating agents are added to break the tablet into smaller particles.

iii) Form Givers

These additives are added to give a desired physical form e.g. surfactants and hydrocolloids, emulsions and suspensions are stabilized by the emulsifying agents and suspending agents respectively. Lactose is used in the preparation of tablets if the quantity of drug is small.

iv) Organoleptic additives

These are the materials which are added in dosage forms to make them acceptable to the patient's e.g.

Colouring agent - to give a good, appropriate colour to the dosage form

Flavouring agent - to give a suitable pleasant flavour to the preparation and is specially important in liquid dosage form

Sweetening agents - to give a sweet taste to the preparation

v) Stabilizers

These are substance or additives which are added in the dosage forms to give physical, chemical and microbiological stability to the product e.g. antioxidants are added to prevent oxidation of the drug.

Antimicrobial preservatives are added to prevent the growth of microorganisms in the product.

vi) Manufacturing Additives

These additives are added to facilitate the processing of a dosage forms. These additives are generally required in the preparation of compressed tablets e.g. lubricants, anti-adhesives and glidants. These additives facilitate uniform flow of granules into the die and help in the ejection of compressed tablets.

Many other additives such as adosbent, buffering agent, humectant, plasticizer, tonicity agents and viscosity increasing agents are used in formulation of dosage form as per the requirement.

1.4.4 Some Commonly used Dosage Forms

Some commonly used dosage forms are given below:

i) **Tablets**

Tablets are solid dosage forms for oral medication made by compaction of suitably prepared medicament (granules) by tabletting machines. They are available in various shapes and sizes, in coated or uncoated form.

ii) **Capsules**

Capsules are solid dosage forms for oral medication in which drug is enclosed in a water soluble shell.

There are two types of capsules:

- Hard gelatin capsules
- Soft gelatin capsules

Hard gelatin capsule is used for the administration of solids e.g. becosule/b-complex etc. **Soft capsules** are used for liquid or semi-solid e.g. pudin hara capsules. Hard gelatin capsules are cylindrical and made of body and cap. Soft gelatin capsules are spherical, ovoid or cylindrical.

iii) **Emulsion**

Emulsion is a heterogeneous system consisting two immiscible liquid, one of the liquid is dispersed in another in the form of droplets. These liquid droplets known as the emulsion globules form the dispense phase or the internal phase while the liquid in which they are dispersed is known as the continuous phase or external phase. There are two types of emulsions:

- Oil in water emulsion in which the oil globules are dispersed in water
- Water in oil emulsion in which water droplets are dispersed in oil.

iv) **Suspensions**

Suspensions are biphasic liquid dosage forms, consisting of finely divided insoluble solid particles suspended in a liquid medium. The solid particles settle on standing and a uniform dose may not be obtained so a suspending agent is added which help in the formation of uniform suspension and the particle will remain suspended for longer time so a uniform dose can be obtained.

v) **Liniments**

Liniments are liquid preparations for external use. Liniments may be alcoholic solutions, oily solutions or emulsions. They are applied with

friction on the skin. They are used for counter irritant and rubefacient action.

vi) **Lotions**

Lotions are aqueous solutions or suspensions used for application to the skin surface. They are applied to the unbroken skin without friction. On application to the skin, the water evaporates leaving a residue of the medicament on the skin surface. The evaporation causes cooling.

vii) **Paints**

Paints are also liquid preparation for external application. They may be aqueous or alcoholic solution and sometimes prepared by using viscous solvents.

viii) **Ear drops**

Ear drops are mostly aqueous solutions dispensed in small quantities and are intended for instillation into the ear. Sometimes they may contain glycerine or alcohol as solvent.

ix) **Gargles**

Gargles are aqueous solutions which are to be used after dilution with warm water. They bring the medicament in contact with the mucous membrane of the throat to give symptomatic relief and may also have some analgesic effect.

x) **Mouth washes**

Mouth washes are liquid preparation used to wash out the mouth and buccal cavity. Antiseptics are generally added in these preparation and they are useful in oral hygiene especially in bed ridden patients.

xi) **Nasal drops**

Nasal drops are aqueous solution for instillation into the nostrils. Oily solutions can not be used as nasal drops as they may cause lipoid pneumonia. Nasal drops contain antiseptic substances or vasoconstrictors to relieve nasal congestion.

xii) **Spray solutions**

Spray solutions are aqueous, alcohol or glycerine solutions for application to the membrane of the throat or nose by means of an atomizer.

xiii) **Inhalations**

Inhalations are solution or suspension of volatile, aromatic or antiseptic substances; the vapours of these substances are inhaled by pouring them into hot water. Inhalations are useful for the relief of nasal congestion.

xiv) **Aromatic waters**

Aromatic waters are clear saturated aqueous solutions of volatile oils or other aromatic or volatile substances. They are also known as medicated waters and are mostly used as flavoured or perfumed vehicles.

xv) **Solutions**

Solutions are liquid dosage forms that contain one or more soluble drugs dissolved in water. Solutions may be used internally or externally for the specific therapeutic effect of the drug.

xvi) **Douches**

Douches are an aqueous solution used for cleansing and as antiseptic agent into a body cavity. Douches are mostly dispensed in the form of a powder with directions for dissolving in a specific quantity of warm water.

xvii) **Enemas**

Enemas are preparations for rectal administration and used to evacuate the bowel, to affect a local disease or to produce affect by absorption.

xviii) **Gargles**

Gargles are aqueous solutions used for treating the pharynx and nasophrynx. They generally contain antiseptics, antibiotics or anaesthetic substances. Many gargles must be diluted with water before use.

xix) **Irrigation solutions**

Irrigation solutions are used to wash or bathe surgical incisions, wounds or body tissues. They are sterile solutions and prepared by dissolving active ingredients in water for injection.

xx) **Syrups**

Syrups are concentrated solutions of sugars like sucrose in water. When only purified water is used for making sucrose solution, it is known as simple syrup. When the syrup contains some medicinal substance, it is known as medicated syrup. Sometimes glycerine or sorbital is added in syrups to retard crystallization of sucrose or to increase the solubility of active ingredient.

xxi) **Mucilages**

Mucilages are thick, viscous, adhesive liquid prepared by dispersing gum in water or by extracting mucilaginous ingredients from vegetable substances by water.

xxii) **Elixirs**

Elixirs are clear, sweetened and flavoured hydroalcoholic liquids for oral use. The solvents are used to increase the solubility of drug. Elixir's main

ingredients are ethanol and water but they may also contain glycerine, sorbital propylene glycol, preservatives and flavouring agents. Elixirs are less viscous than syrups.

xxiii) **Glycerines (Glycerites)**

Glycerines (Glycerites) are solutions or mixtures of drug substances in glycerine. These preparations contain not less than 50% by weight of glycerine and are extremely viscous.

xxiv) **Suppositories**

Suppositories are specially formulated solid dosage forms for insertion into rectum, vagina, urethra or other body cavities except mouth. They melt or dissolve in the body to release the medicament and produce local or systemic action.

SAQ 3

Define dosage form?

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SAQ 4

Name the additives used in dosage form.

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1.5 PACKAGING OF DOSAGE FORMS

The proper packaging, labelling and storage of pharmaceutical products are essential for product stability and efficacious use. Different specifications are required for parenteral, non-parenteral, pressurized and bulk containers and for those made of glass, plastic and metal. Container is defined as a device which holds the pharmaceutical preparation.

The immediate container is that which is in direct contact with the preparation at all times. Desirable features of a container are:

i) The container must be rigid enough to withstand wear and tear during normal handling and to prevent damage to the contents e.g. breaking of tablets.

ii) The container material should not react with the contents.

iii) The container must protect the contents from deterioration by environmental factors like oxygen and moisture.

iv) The container must prevent loss of moisture from contents.

v) The container must prevent leakage of contents.

vi) The container must prevent entry of dirt, other chemical or microbiological contamination.

vii) The container should be sterilizable without any change.

viii) The container should give protection from light when required.

ix) The container must not absorb anything i.e. medicament or additives from the contents.

x) The container must not impart anything to the contents.

xi) The container must be easy to label.

xii) The container must be pharmaceutically elegant.

1.5.1 Types of Container

Containers are classified in two ways:

a) According to their ability to protect the contents from external condition
b) According to number they contain

a) According to their ability to protect the contents from external condition: In this category they can be classified into six groups i.e.

i) *Well closed containers*

This type of container protects the contents from external solids and from loss of the contents under ordinary conditions of handling, shipment, storage and distribution.

ii) *Tight container*

This type of containers protects the contents from contamination by external liquid, solid and vapour. It should prevent changes due to efflorescence, deliquescence or evaporation.

iii) *Hermetically sealed*

These containers will not allow air and other gases to pass through the container under normal condition of handling. These containers are sterile and used for holding sterile preparation.

iv) *Light resistant container*

These containers protects the contents from photochemical deterioration e.g. Amber glass and opaque plastic containers.

v) *Temper evident container*

These types of containers are fitted with a mechanism or device which reveals irreversibly the opening of container.

vi) *Child resistant*

These types of containers are designed in such a way that cannot be opened by children.

b) According to number they contain: In this category, they can be classified into two groups i.e.

i) *Single dose container*

These containers are used to provide a single dose of the medicaments. These containers once opened cannot be resealed to maintain sterility e.g. ampoules.

ii) *Multi dose containers*

These containers allow withdrawal of successive doses without changing the strength or affecting the purity of the remaining contents. Multi dose containers are hermetically sealed e.g. vials.

1.5.2 Material for Construction of Containers

Containers are mainly made up of a) glass or b) plastic. Other materials are also used as per the requirement of the drugs.

a) Glass Containers

The glass containers used for pharmaceutical products are classified into four categories. This classification depends on the chemical constitution and its ability to resist deterioration.

Type I, II and III glasses are used for parenteral products (injectables) and type NP is used for non-parenteral products.

Type of Glass	General Description
I	Highly resistant, boro silicate glass
II	Treated soda lime glass
III	Soda-lime glass
NP	General purpose soda-lime glass

Glass is the most widely used material for containers for pharmaceutical use. Depending on the contents, the glass may be classified as:

i) *Soda-lime glass*

It is prepared from silica, soda ash and lime stone. It is not suitable for storage of aqueous parenteral preparations because it contains higher concentration of alkali oxide and can impart alkalinity to aqueous preparation.

ii) *Sulphured glass*

It is prepared by treating the surface of soda lime glass with moist sulphur dioxide at 500°C. This glass can be used for alkali sensitive and for parenteral products.

iii) *Silicon treated glass*

This glass is prepared by coating the surface of soda lime glass with silicons. This makes the glass surface hydrophobic. It can be used for alkali sensitive preparation.

iv) *Borosilicate glass*

It is highly resistance glass containing silicon-di-oxide and a very small portion of metal oxide. It is used for manufacture of laboratory glass ware and containers for alkali sensitive products.

v) *Neutral glass*

This glass is softer than borosilicate glass. It is highly resistant to autoclaving and is used for containers of alkali sensitive material.

vi) *Coloured glass*

The coloured glass containers are used for light sensitive drug. Amber coloured and red colour glass give protection from light. Coloured glass is produced by adding metal oxide during the fusion of glass.

Advantages of glass containers

- Chemically inert – Glass is inert to most of the chemicals
- Rigid and strong hence it can be easily used on high-speed machine
- Give good protection from heat, air and moisture
- Protection from light if the coloured glass is used
- Can be easily moulded into various shapes
- Easy to clean, durable
- Can be easily sterilised by moist as well as dry heat.

Disadvantages of glass container

- Flaking – The flakes of silica may appear in the product.
- Weathering – Loss of brilliance of glass due to deposition of alkali carbonate.
- Glass containers are fragile.

– Glass containers are heavy so the transportation expenses are high.

b) Plastic

Plastics are a group of high molecular weight synthetic polymers. Plastics include lubricant, stabilizers, plasticizers, antioxidant, colouring agents, impact modifiers etc., in addition to the basic polymer.

The various types of plastics used for manufacturing of containers are, polyethylene, polypropylene, polyvinyl chloride, polystyrene, polyethylene tetraphthalate etc.

Advantages of plastics

– Highly flexible so they can be formed into various shape and size
– Rigid
– Light in weight so transportation cost is low
– Resistant to moisture and heat
– Label can be imprinted on the container
– Some plastics can be sterilized by autoclaving
– They are cheaper.

Disadvantages of plastics

– Permeable to gases and moisture so cannot provide protection from air and moisture.
– Plastics have low strength.
– Some plastics cannot withstand high temperature.
– Additives from plastic material may leach into the product.
– Plastics may adsorb or absorb ingredients of the product.
– Plastics may give odour and taste to the product.
– Plastics have the property of electrostatic attraction.
– Organic solvents and oil may react with plastics.

The other materials used for manufacture of pharmaceutical containers are metals, paper and board. The metals commonly used are aluminium, tin plated steel, stainless steel, tin and lead.

SAQ 5

Define containers?

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SAQ 6

Which glass containers can be used for acquiring parentral preparations?

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1.6 SUMMARY

A prescription is a medication order written by a doctor, dentist or a veterinary surgeon for the supply of a medicine, dressing or a surgical instrument to a patient. The prescription is necessary for supply of medicines by the pharmacy. The prescription gives details of particulars of the patients like name, age and sex. Age and sex are important as these parameters are used to calculate the dose of drug required. Children and females require less amount of drug compare to adult male. The dose for children can be calculated from the body weight, age and body surface area. The prescription has directions for the pharmacist and for the patient about the use of drug.

Drugs are not used in the form of pure chemical substance but are given in the compact formulated preparations known as dosage forms. The dosage forms are prepared by using one or more non-drug additives or excipients that have specialized pharmaceutical function. These additives are used in dosage forms to solublize, suspend, thicken, preserve, emulsify, to improve the organoleptic properties and to improve the compressibility and to give an efficacious dosage form. Dosage forms can be classified in different ways i.e. on the basis of route of administration and physical form.

The proper packaging, labelling and storage of pharmaceutical products are essential for product stability and efficacious use. Different specifications are required for parenteral, non-parenteral, pressurized and bulk containers. The containers used for pharmaceutical products are made of glass, plastic, paper, board and metal.

1.7 TERMINAL QUESTIONS

1. What are various parts of a prescription?
2. Why stabilisers are added in dosage form?
3. What are syrups?
4. What is a hermatically sealed container?
5. What are the disadvantages of glass containers?

1.8 ANSWERS

Self Assessment Questions

1. Prescription is a medication order by a doctor, dentist or a veterinary surgeon for supply of a medicine, dressing or a surgical instrument to a patient.

2. $$\text{Child dose} = \frac{\text{age in years}}{\text{age in years} + 12} \times \text{adult dose}$$

$$= \frac{5}{5+12} \times 100$$

$$= \frac{5}{17} \times 100$$

Child dose = 29.41 = 30 mg

3. Drug substance given in formulated preparations are known as dosage form. They contain drug and some non-drug additives.

4. Form gives, disintegrating agent, vehicles, bases, diluents, organoleptic additives, stabilizers and manufacturing additives.

5. Container is a device which holds the article and may be in direct contact with the pharmaceutical preparation.

6. Type I, Type II and Type III glass containers can be used for parenteral preparations.

Terminal Questions

1. i) Prescribers office information
   ii) Information about patient or patient information
   iii) Date
   iv) Superscription or Symbol Rχ
   v) Inscription
   vi) Subscription
   vii) Signature or Signa
   viii) Prescriber's signature, and license No.
   ix) Special labelling, refill and other instructions

2. Stablilizers added in dosage forms to provide physical, chemical and microbiological stability to the product.

3. Syrups are concentrated solution of sucrose in water. They are frequently used as vehicle in the liquid dosage forms.

4. A hermetically sealed container does not allow air and other gases to pass through the container under normal conditions of handling. These containers are used for holding sterile preparations.

5.
   - Flaking
   - Weathering
   - Fragility
   - Weight (Heavy)