JRG College of Pharmacy

JRG COLLEGE OF PHARMACY

UNIVERSITY SOLVED QUESTION

WITH ANSWER

Year : 2024-25

Subject : Pharmaceutics

Subject Code : BP103T

Subject In-Charge : MS.Monali padhi & Mrs. Adyasha Senapati

Registration No.: | | | | | | | | | | |

Total Number of Pages:02 | Course: B. Pharm
SUBJECT: Pharmaceutics - I | Sub Code: BPT103T

1st Semester Regular/Back Examination: 2024-25

BRANCH(S): B. Pharm | Q. Code: A220
Time: 3 Hours | Max Marks: 75

Answer Question No.1 (Part-I) which is compulsory, any seven from Part-II, and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q		Answer the following questions mentioning the answer with correct option (MCQs)								(20 x1)
	1)	Advantage of liquid dosage form over the powders:								
		a	Bioavailability is less	b	) More bulky	c	Easy to swallow	d	Easy to handle	
	2)	In heat method of preparing effervescent granules to make damp mass _____ releases 1 molecules of water of crystallization.								
		a	Citric acid	b	Tartaric acid	c	Sucrose	d	Sodium bicarbonate	
	3)	_____ increases viscosity of suspension and delays sedimentation of particles.								
		a	Preservatives	b	Co-solvents	c	Thickening agent	d	Sweetening agent	
	4)	Cocoa butter also known as:								
		a	Theobroma oil	b	Olive oil	c	Glycerin	d	Coconut oil	
	5)	The chairman of the first edition of IP was _____.								
		a	Dr. B.N. Ghosh	b	Mr. Prasana Totta	c	Dr. Nityanand	d	Dr. B. Mukherjee	
	6)	As per Young's formula, what is the dose of the drug for a 6 years child if adult dose is 1000 mg								
		a	333.3 mg	b	33.3 mg	c	666.6 mg	d	66.6 mg	
	7)	Nasal drops are _____.								
		a	Isotonic	b	Hypertonic	c	Hypotonic	d	None	
	8)	Which base should be selected when water wash ability is the key requirement?								
		a	Hydrocarbon	B	Absorption	C	Emulsion Base	D	Water Soluble	
	9)	Which base is likely to be the most occlusive on the skin?								
		a	Hydrocarbon	b	Absorption	c	Emulsion	d	Water Soluble	
	10)	In the preparation of cold creams, which types of bases are used generally?								
		a	Hydrocarbon	b	Absorption	c	Emulsion	d	Water removable	
	11)	The sizes of the dispersed particles in a colloidal dispersion are _____.								
		a	Less than 1 nm	b	More than 0.5 µm	c	0.5 to 1µm	d	1 to 500nm	
	12)	In liquid dosage form which of the following dosages forms is used for oral administration?								
		a	Elixirs	b	Liniments	c	Lotion	d	Enema	
	13)	_____ is a branch of medicine which deals with doses of drug.								
		a	Pharmacology	b	Pharcotherapeutic	c	Posology	d	None	
	14)	Bougies are meant for:								
		a	Vagina	b	Urethra	c	Rectum	d	Nasal cavity	
	15)	Disodium EDTA is an example of _____ agent.								
		a	Sweetening	b	Flavoring	c	Chelating	d	None	
	16)	Which of these is an example of inorganic emulsifying agent?								
		a	Methyl cellulose	b	Gelatin	c	Bentonite	d	Tragacanth	
	17)	Massuppol consist								
		a	Triglycerides of saturated vegetable oil	b	Glyceryl esters	c	Monoglycerides of saturated fatty acids	d	All of the above	
	18)	The monophasic liquid dosage form is a form of _____ solution.								
		a	True	b	Course	c	Fine	d	Micro	
	19)	Suppositories are generally evaluated by;								
		a	Melting range test	b	Liquefaction	c	Breaking test	d	All of the above	
	20)	Which statement is false for flocculated suspension								
		a	High rate of sedimentation	b	Stick to the sides of the bottle	c	Particles exhibit loose aggregates	d	Difficult to redisperse	

Part-II

QII **Focused-Short Answer Type Questions- (Answer Any Seven)** **(7 x 5)**

1) Write a short note on parts of a prescription.
2) Discuss with proper examples effervescent, efflorescent and hygroscopic powders.
3) Write a short note on solubility enhancement techniques.
4) What are the contents of current edition of Indian Pharmacopoeia?
5) Calculate the volume of 95% alcohol required to prepare 300ml of 70% Alcohol by alligation method.
6) Write a short note on dusting powder.
7) Differentiate between flocculated and deflocculated suspension.
8) What is therapeutic incompatibility, discuss with its remedy.
9) What are the various methods of preparation of creams, discuss in detail.

Part-III

QIII **Long Answer Type Questions (Answer Any Two)** **(2 x10)**

1) Define emulsions. Discuss their methods of preparations and stability problems in detail.
2) Define and classify incompatibility. Discuss physical incompatibility with examples
3) What are the various factors affecting dermal penetration? Discuss method of preparation of ointments.

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1st Semester Regular / Back Examination: 2024-25

Pharmaceutics - I

Max marks - 75

B. Pharm

Sub- code - BP103T

(Q1)

(1) Easy to swallow

(2) Citric acid.

(3) Thickening agent

(4) Theobroma oil

(5) Dr. B.N Ghosh

(6) 333.3 mg

(7) Isotonic

(8) Emulsion base

(9) Emulsion

(10) Emulsion

(11) 1 to 500nm

(12) Elixens

(13) Posology

(14) Urethra.

(15) Chelating

(16) Bentonite

(17) All of the above

(18) True

(19) All of the above.

(20) Difficult to redispens.

Part-II

Q11)

(1) Prescription

A Prescription is a legal document or order written by a qualify health care Professonal on diagnosis, prevention or treatment of a specific patient diseases is retained by a licensed practicioner.

→ The prescription are generally written in the english language but Latin words or abbrivations are frequently used to save time.

Parts of Prescription

- Date
- Name, Age, sex and address of the patient.
- Superscription
- Insciption.
- Subscription.
- Signatura / Transcription.
- Renewal instruction.
- Signature, address and registration number of Prescriben.

Date

→ It is very important part of a Prescription as it helps a pharmacist to find out the date of Prescribing and date of Prescription.

- In case of narcotic and habit forming drug, the date prevents the misuse of drug by the patient.

Name, Age, sex & address of the patient

- Name and address of the patient helps in the identification of patient while age & sex helps to decide the dose for that particular patient.

Superscription

→ It is represented by 'Rx' symbol.

→ It is a Latin word which means 'YOU TAKE'

- In olden days ; the symbol was considerd to be ani the symbol of Jupiten, which is considerd as Gnod or healing. The symbol was employed by the ancient in requesting god for the quick recovery of the patient.

Inscription

→ It is the main part of the prescription containing name and quantities of prescribed medicaments.

- The name of each ingredient is written on a separate line along with it's quantity

Subscription

- In this part prescriben gives direction to the pharmacist regarding to dosage form and number of dosage to be dispensed.

Signatura

- In this part prescriben gives direction to the patient regarding to ~~dosage~~ form administration of drug;

It contains

- Quantity / Amount to be taken.
- Frequency / Timing of administration
- Special instruction such as dilutions.

Renewal Instruction

- In this part prescriben indicates whether the prescription may be renewed or not and if so then how many times.

→ It is very impordant specially in the prescription containing narcotic and habit forming drug to avoid it's misuse.

Signature, Address and Registration No. of Prescriben.

→ It is very important and how much needed part of prescription to verify that the prescription is official & issued by the doctor.

(2)

Effervescent powder

→ These are those powder which produce Effervescent i.e release of CO_2. If contain medicaments (API) mixed with acid and base which react together and it produce CO_2

Ex - ENO

Method

→ After citric acid mixed with sodium bicarbonate then the powder passed through granulator to obtain Granules.

Efflorescent powder

→ These are those substance which looses water to form a lower hydrate or become anhydrous is termed as efflorescent powder.

→ Present in the form of crystal granules.

Hygroscopici powder

Powders absorb moisture from air leading to clumping & cracking or changes in properties like disolution rate & bio-ability

Ex - NaCl,

(3) Solubility enhancement techniques

(i) pH change.

(ii) Co-valent.

(iii) Particle size reduction.

(iv) Solid dispersion.

(v) Hydrotrophy method.

(vi) complexation.

(i) pH change

→ A solubility of poorly soluble drug i-e either weak base or ~~weak~~ weak acid may altered by adjusting the pH of the solution

ex → Addition of Buffer to the formulation.

(ii) Co-solvent

→ It is a technique to increase the solubility of poorly soluble drug in a liquid.

→ By using co-solvent we can increase the solubility of poorly soluble drug.

ex → Procien glycon.

(iii) Particle size reduction

→ The solubility of a product is also depend on a particle size, so, by decrease the particle size we can increase the solubility of product

(iv) Solid dispersion

→ In solid dispersion a poorly soluble drug dispersed in a highly soluble solid hydrophilic matrix which enhance the solubility.

(v) Hydrotrophy method

→ In this method by adding large amount of secondary solute increase the aqueous solubility of water insoluble drug.

Ex - Solubility of theophilline with Sodium benzoate.

(vi) Complexation

→ It is a process of association two or more molecules to form a Non-Bonded entity.

→ It is used to improve bioavailibility of poorly soluble drug

Ex → Chealats.

(4) Contents of Indian Pharmacopoeia

- contens of Indian Pharmacopoeia is 2022 (9th edition)

→ It is published by Indian Pharmacopoeia commission (IPC) Ministry of Health & family welfare GOVT of India.

→ It is effective from 1st december 2022.

→ Comprises - 4 volumes containing 3,152 monographs and 12 new general chapters.

→ Major contents includes :-

- General Notices and general chapters (testing method

reagents, reference, standards.

- Monographs on drug substance, Dosage forms and Pharmaceutical Aids (A to z)

→ Monographs on:

- Vitamins, minerals, amino acid & fatty acids
- Phytopharmaceuticals and herbal Products.
- Vaccines and immunosera.
- Blood & blood - related products.
- Allergen and radiopharmaceutical preparation.

→ Veg. Veterinary monographs and diagnostic biologicals.

Special features :-

→ Harmonised with USP, BP & EP.

→ Promotes in vitro testing and updated, analytical methods.

→ Legally enforceable under the drugs and cosmetic Act 1940

(5) Given,

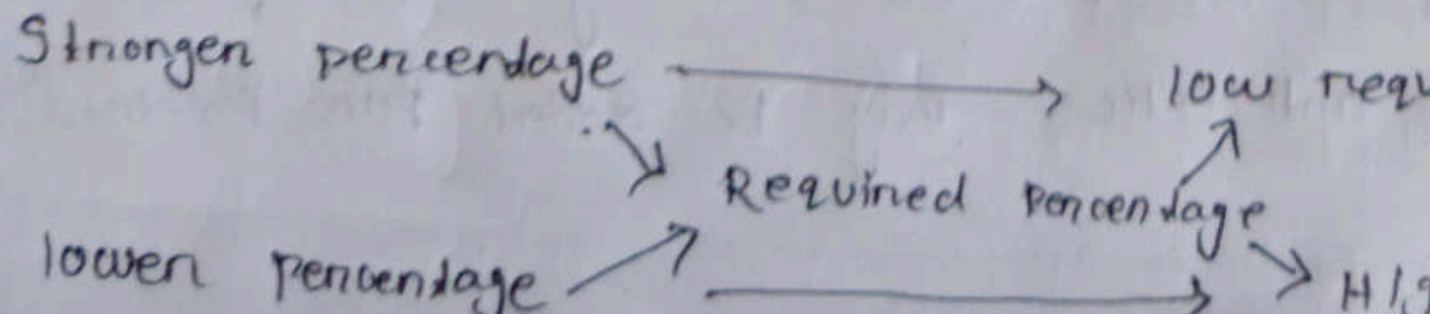
Volume required = 300ml

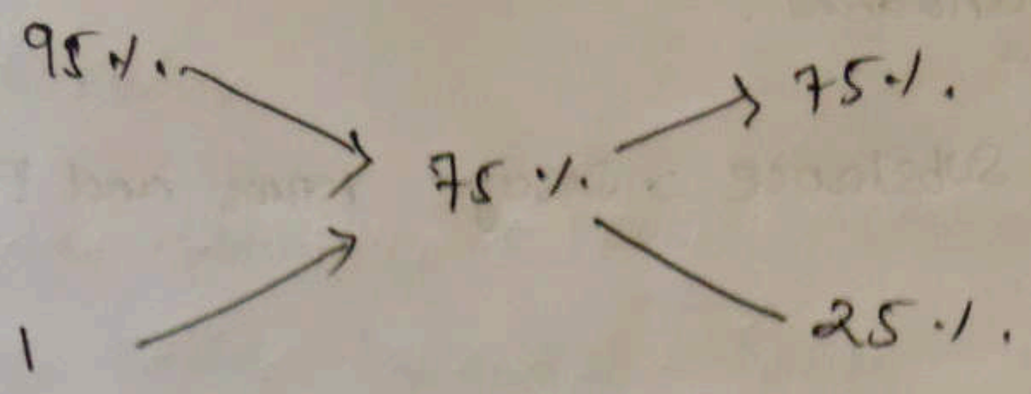
Volume or % required = 70%.

High percentage = 95%.

low percentage = 0%.

According to alligation methode.





Volume of alcohol = $\frac{\text{Volume required} \times \%\text{ required}}{\text{percentage used.}}$

$= \frac{300\,ml \times 75}{95}$

$= 236.84\ ml$

Hnce the of alcohol is 236.84 ml.

(6) Dusting Powder

→ Dusting Powders are finely divided ; free - flowing Powders used for external application on the skin to provide a cooling , soothing & protective effect. They are generally applied to absorb moisture reduce friction and prevent skin infection.

Characteristics

→ Should be free from grittiness and irritant substance.
→ must have good covering and adhesive properties.
→ Should be non-toxic and chemically stable..

Common ingredients

→ Base: Talc · kaolin, starch
→ Medicinal agents : zinc oxide, salicylic acid, boric acid.
→ perfume or antiseptics may be added for pleasant odour and extra.

Examples:

→ Talcum powder

→ Antifungal dusting powder containing clotrimazole or miconazole.

Uses

→ To keep skin dry and smooth

→ To prevent rashes, infections and irritation.

(7)

Flocculated	Deflocculated
→ In this types of suspension the particles from a network like structure on flocculation.	→ In this type of suspension the particle exists as separate entity
→ Due to smaller particles (higher size) the sedimention rate is high.	→ Due to small particles the sedimentation rate is slow.
→ Re-dispersion is easily done by agitation	→ Re-dispersion is difficult by agitation (hard cake)
→ Bio-availability is low	→ Bio-availability is high
→ Supernatent liquid is clear.	→ Supernatent liquid is not clear.
→ Suspension is not pleasing in appearance.	→ Suspension is pleasing in appearance.
→ It is stable.	→ It is very less stable.

(8) Therapeutic Incompatabilities

→ Therapeutic incompaccability may be the result of prescribing certain drugs to the patient with the intention to produce a specific degree or action but the nature on intensity of the action produced is different from that intended by Prescriben.

Causes of Therapeutic Incompatabilities

It may be occur due to

→ overdose / Improper dose of a single drug.

→ Improper dosage from

→ contraindicated drug.

→ Synergistic and Antagonistic drug.

Exampe of overdose.

Codeine Phosphate ---- 0.5gm

Direction for Pharmacist

- ~~make for Pharmacist.~~
- make powders.
- send such to powders.
- 1 dose to be taken at bed time.

In the above prescription ; Physician write 500 mg (0.5 gm) instead of .5 mg of codeine phosphate.

Example of drug interaction

Tetracycline Hydrochloride - ..... - 250gms.

Direction for Pharmacist

- make capsule send such 10 capsules.
- Take 1 capsules every 6 hrs with milk

→ Now in the above prescription dose is alright but the direction is wrong tetracycline should not be given with milk because. the calcium that present in milk inactivates the action of tetracycline.

(9)

Creams

→ These are semi-solid preparation in which one or more medicaments are dissolved in emmusion base (o/w, o/w) or in water. Soluble bases.

Eg - Vanishing cream (o/w emmusion) / aqeous cream
Cold cream (w/o emmusion) (oiling cream)

→ These are prepared using fusion methode.

FUSION method

→ This methode involve heat and sweetable for waxy material and hard bodies. and for these ointments. bases which contain solid ingredient. having different melting point. melt substances by using decreasing order of their melting point.

Step

Takes the waxy base

↓

Meait using water bath

↓

High melting point base first ; mix low meaiting point bases it.

↓

Dissolve.

↓

Add small volume phase in large vol. phase.

↓

Cooling under stirring

↓

Homogenization

↓

Filling.

(Q III) EMULSION Part - III

An emuesion is a biphasic liquid dosage form in which two immiscibee liquid are mixed together to form a stabee emuesion with the heep of emuesifying agent.

Eg :- Vanishing, cream, bee, Lotion.

Advantages

- More rapid absorbed.
- Sustained release medication
- Mask unpeeasant taste.
- gmpeoved ..bio-availabeity.
- Easy to produce and scaeeup.
- High encapsueation effieieney.
- More Economic.

Disadvantages

- Chanees of eracking emuesion.
- Dose accuracy deerease.
- unstabee emuesion.

Types

(i) Oil in Water (O/W)

These are those types of emuesion in which oil is a dispersed phase and water is continuous phase.

Ex:- Milk, Cream, Lotions.

(ii) Water in oil (W/O)

- These are those type of emuesion in which water is mixed in oil or water is dispersed phase and oil is continuous phase.

Ex:- Butter, Cold cream.

Preparation of Emulsion

1) Dry gum method.
2) Wet gum method.
3) Bottle method.

1) Dry gum method

→ In this method the oil is first triturated with gum with a little amount of water to form the primary emulsion.

↓

The trituration is continued till a 'cracking' sound is heared and a thick white cream is formed.

↓

once the primary emulsion is formed the remaining quantity of water is slowly added to form the final emulsion.

∴ Ratio used [4:2:1] [oil : water : gum]

(2) Wet gum method

In this method firstly gum and water are triturated together to form a mucilage

↓

The required quantity of oil is then added gradually in small portions through trituration to form the primary emulsions.

↓

Remaining quantity of water is added to make the final emulsion

↓

∴ Ratio used [4:2:1] [oil : water : Gum]

(3) Bottle Method :-

→ used to prepare emulsion of volatile oils or substance having very low viscosities.

Part gum acacia is peaced in a dry bottle.

↓

Part of oil are added

↓

Shake the mixture throughey after capping.

↓

A volume of water (approx. equal to oil.) is added in portions.

↓

Again shake the mixture throughey until the primary emuesions is formed.

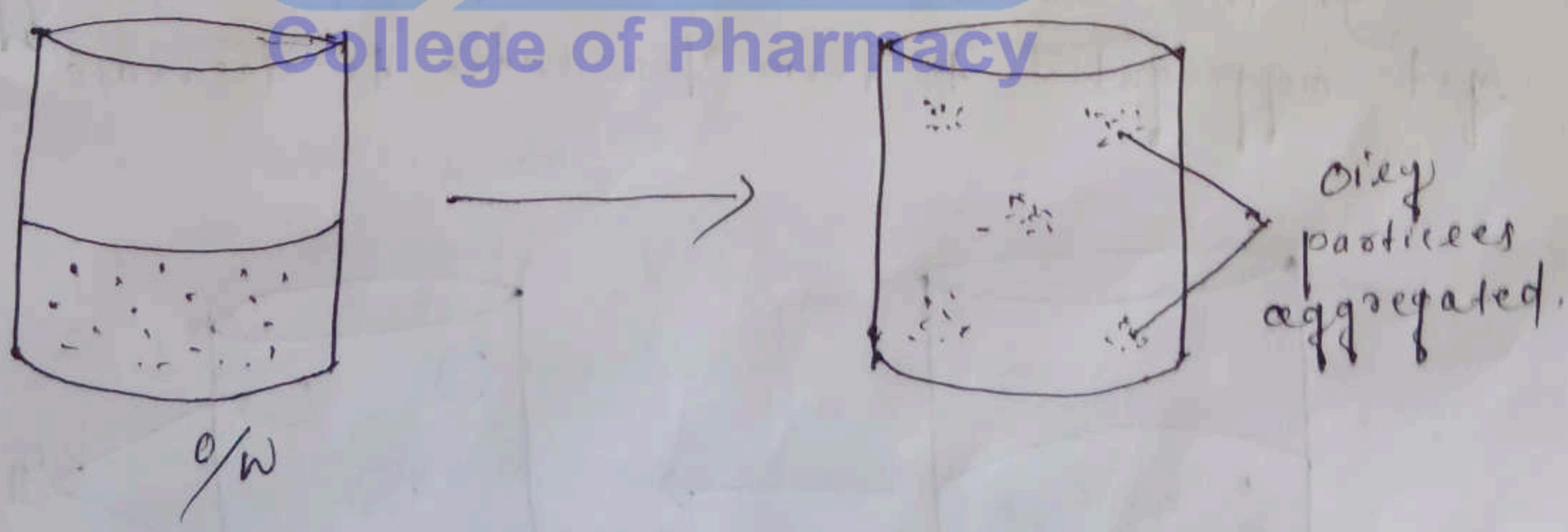
↓

Dilute it with proper volume of water

Stability probeems and methods to overcome

1) Coalescence

The oily particees (Dispersed phase) because of sticky nature attract each other and they aggregate to form big particees.

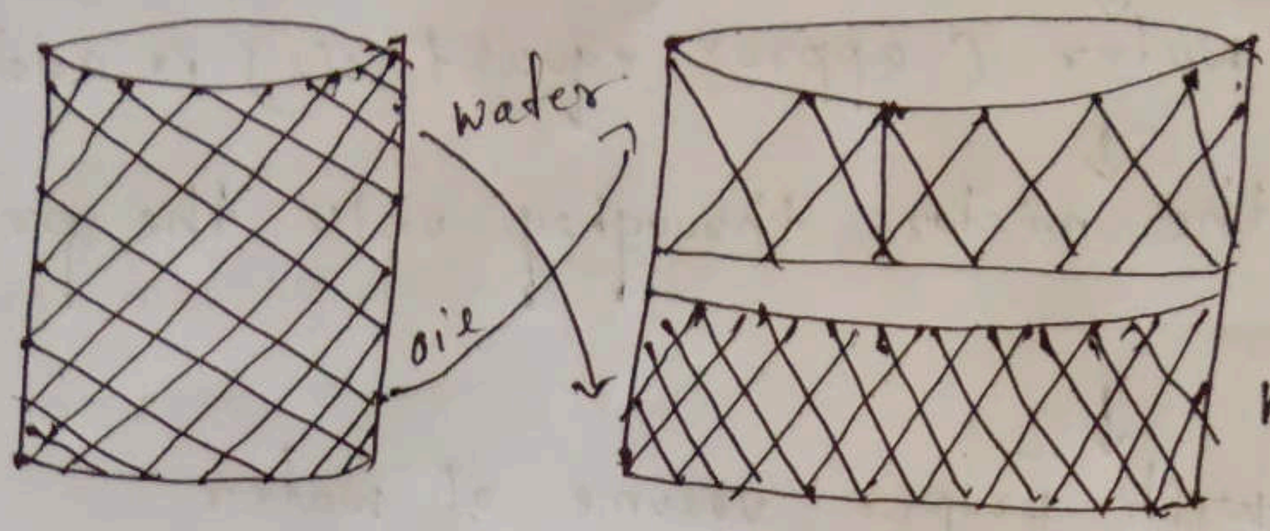


Overcome

- Suitabee emuesifying machinery shoued be empeoyed in the preparation
- Precaution shoued be undertaken while adding emuesifying agent.

(2) Breaking (Cracking)

Due to improve mixing of oil and water in emuesion & emuesion get separated in to two eayer oil and water.
-> gt is aeso occured due to improper ratio of oil & water.

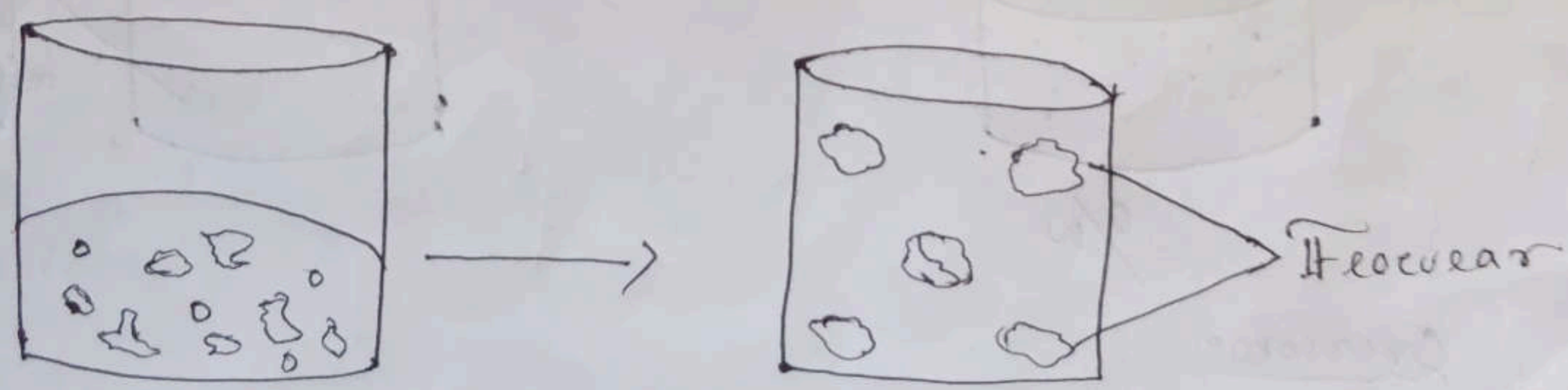


overcome

More emuesifying agents shoued be added in the preparation
-) The temp. at which the emuesion are store shoued be under controe.
-) Requeate the cone. of disperse phase.

(3) Ifeocueation

gn this, due to increased surface free energy particees get aggregated to form ifeocueates to decreaie surface area



overcome

If high energy barrier exist in the presence of high charged on the dispersed dropeets.

4) Creaming

It is a reversible phenomenon in which droplates of dispersed phase come together or deposite at the surface of the emuesion.

overcome:

The viscosity of continuous phase can be improved by adding viscosity enhancers.

→ The density defference b/w the two phase shoid be reduced.

→ The emuesion shoued be stored in a cool peace at a low tempreature.

5) Phase Inversions

In this the phase of emuesions get inverted

O/W → W/O / W/O → O/W

It happended due to mixing probeem or by choosing wrong dispersed phase during formuation.

overcome

Add adequate quantity of preservative in the preparation.

→ Suitabee preservative for each oil and aqueous phase shoued be used.

INCOMPARTABILITY

- When two or more ingredients are mixed together to prepare a medicine and on undesired change takes peace which affect the physical, chemical and theraputic properties of medicament then the phenomenon is termed as incompartibeility.
- Incompatabeities are usualy unintetionae.

Incompatabeities may occur during

- Compounding
- Formuation
- Manufacturing

- Packaging
- Dispensing
- Storage
- Administration

Incompatabilities can Affect :-

- Safety of medicament
- Efficacy of product
- Appearance of medicine
- Purpose of medicament.

Type of Pharmaceutical incompatabilities

1. Physical incompatability.
2. Chemical incompatability.
3. Therapeutic incompatability.

Physical Incompatability

- When two or more than two substances are combined together and a physical change takes peace which results in the formation of an unacceptable product, then this phenomenon is known as physical incompatability.
- Physical incompatability involves interaction between two or more substances which leads to change in colour, taste viscosity or appearance of the product.
- The changes that occurs due to physical incompatability are usually visible and can be corrected by taking proper action.

Exampee of physical incombatability

- Immiscibility.
- Insolubility
- precipitation
- Liquefaction.

Immiscibility

Oils and water immiscibee with each other, but they can be made miscibee by emuesification.

Ex:

• Caster oil	— 15 ml
• Water	— 60 ml
Make an emuesion	

Now in the above prescription caster oil is immiscibee with water to overcome this incompatability an emuesifying agent is used to make a good emuesion.

Insolubility

Insolubility takes peace when a drug is insoluble in a particular solvent

example

Ephedrine Sulphate	— 0.25 gm
Menthol	— 0.2 ml
Liquid paraffin	— 30 ml

Now the above prescription ephedrine Sulphate is not soluble in liquid paraffin but anhydrous ephedrine is soluble in it, Hence ephedrine Sulphate is substituted with anhydrous ephedrine in the above prescription to make a clear solution.

Precipitation

If drug in a solution may be precipitated, if it is insoluble in the solvent in which it is added.

example:

- Resins are insoluble in water, when it is added in the water it gets precipitated.
- It can be prevented by adding a suitable thickening agent.

Liquifaction

When two or more solid having low melting point are mixed then get converted into liquid.

Example:-

- gt medicament containing menthol, thymol, camphor. phenol etc mixed together, they gets converted in to liquid
- To prevent liquefaction, ingredients should be either dispensed Separately or may be mixed with enough quantity of absorbent powder.

3) Factor influsing dermal penetrating drug:-

→ These are the factor which may effect the permmision slass penetration of drugs.

→ They are classified into 2 types:-

(i) Biological factor

(ii) Physiological factor

(i) Biological factor:-

These are those factors which are related to body and effect the penetration.

- Skin condition
- Skin age
- Blood flow
- Resonal skin sites
- Skin metabolism
- Skin hydration

Skin condition :

- There are various skin related vactors which may effect the drug permission.

ex → Age, disease, climate, injury.

→ Absorbtion is greater in gung skin then old.
→ injured skin have great penetration.

Skin aget

- It is an important factor in drug obsorption like children have more absorption of drug than adult to skin.

→ Drug absorption also tends to give more toxic effect in children compair to adults.

Blood flow :

- If the blood flow reducess then it increases the Penetration of drug. As it increases the time of contact. so blood absorb more drug.

Resonal skin sites :-

- It is also depends on the thickness of skin which various different placess.

ex → Thiner skin, like facial skin have more penetration than thicker skin like pam & feet.

Skin Metabolism :

- skin have the ability to metabolise some drug which may effect the drugs efficasy and absorbtion.

→ Skin metabolises about high percent of topically applied blood.

ex → steroidal hormones.

Skin hydration:-

- It is a condition when skin get saturated with water and skin tissue, sweap softness, wrinkels.
→ so, it increases the rate of drug permmision.

(ii) Phyiological chemical factors:-

These are those factor which has related to phyical and chemical properties of drugs.

(1) Temp. and pH
(2) Diffusion coffi cent
(3) Drug concentration
(4) partion coefficient
(5) molecular size & shape
(6) perqutaneous enhans

(1) Temp. & pH :-

- Temp. is directly propotional to drug penetration, so if temp. increases the penitration.
→ unionised molecule have great penetration.
- Drugs with pH b/w 4.5 - 5.0 mostly below 5 are based for drug penetration. through skin.

2) Diffusion coefficient:

- It mainly depends on nature and state of the drug.

3) Drug concentration:

- It mainly based on the conc. gradiant.
- High conc. of drugs have more penetration than the normal conc.

4) partion coefficient:

- It is tell us about the nature of drugs either it is lepophilic or hydrophilic.
- → Hydrophilic drugs have more penetration.

B) Molecule size and shape:

- The smaller the size of molecules the greater will be its penetration rate.

6) percutanous Enhanse:

- These are those substances which are basically used to enhance the absorbtion of drugs through skin.
  ex→ Acetone.

OINTMENT:

- These are the smi-solid preparation that are intented to applied on the skin or certin mucus membrane.
- They consistance is such that they easily rough on the skin.

eg → Lidocine ointment.

- It is of 3 types
  1. Hydrophylic
  2. Emulsifying
  3. water soluble ointment
- It can be prepared by using trituration and fusion methode.

semi-solid dosage form can be prepared by using following methods.

1. Trituration methode
2. fusion method

Trituration Method :-

- It is widly used method.
- If large amount of liquid have to add in the base then this is sweetable.

Step-1 :-

- we have to reduce the size of drugs and make a fine powder i.e. size reduction.
- Now decrease the particle size of powder via trituration.
- add small amount of liquid.
- Now add sweatable base and add their required exipient via trituration.
- Now add remaining base to finalise weights,
- Now perform homogenisation to reduces sizes, make semi solid more stable and effective, fined it store it.

FUSION METHOD :-

This method involve heat and sweatable for waxy matarial and hard bodies and for those ointments bases which contain solid ingrediant having different melting point. Mealt substances by using decreasing order of their melting point.

Step-1

Take the waxy base

↓

melt using water bath

↓

High melting point base first, mix melting point bases, it

↓

Dissolve

↓

Acid - small volume phase in large vol. phase

↓

cooling unter stearing

↓

Homogenation

↓

Filling.