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SUBJECT

PHARMACEUTICS



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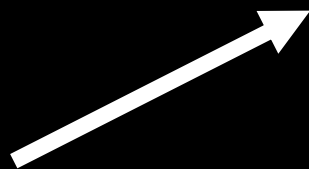
40 QUESTIONS WITH DETAILED EXPLANATION

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1. Identify the mismatched pair

(a) Flow through cell- USP apparatus-4

(b) Reciprocating cylinder- USP Apparatus-3

(c) Paddle over disc- USP Apparatus-5

(d) Reciprocating holder- USP Apparatus-6





1. Identify the mismatched pair

(a) Flow through cell- USP apparatus-4

(b) Reciprocating cylinder- USP Apparatus-3

(c) Paddle over disc- USP Apparatus-5

(d) Reciprocating holder- USP Apparatus-6





Explanation -

S. NO	USP APPRATUS	DESCRIPTION	ROTATIONAL SPEED	DOSAGE FORM
1.	Type 1	Basket apparatus	50-120rpm	Conventional tablets, chewable tablets
2.	Type 2	Paddle apparatus	25-50rpm	Disintegrating tablet, chewable tablets
3.	Type 3	Reciprocating cylinder	6-35rpm	Chewable tablets
4.	Type 4	Flow through cell apparatus	N/A	Poorly soluble API, powders, granules
5.	Type 5	Paddle over disk	25-50rpm	Transdermal
6.	Type 6	Cylinder	N/A	Transdermal
7.	Type 7	Reciprocating holder	30rpm	Non disintegrating and transdermal





2. Sodium starch glycolate is used as

- (a) Lubricant
- (b) Super disintegrant
- (c) Binder
- (d) Glidant





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(a) Lubricant

(b) Super disintegrant

(c) Binder

(d) Glidant





Explanation -

SUPER DISINTEGRANT	CONCENTRATION (W/W) (%)	COMMENTS
Modified starch: Sodium starch glycolate	1-10	It is sodium salt of the carboxymethyl ether of starch, e.g. Primogel, Explotab (Tradename)
Modified cellulose: Cross carmellose sodium	2	Sodium CMC which has been crosslinked to render it insoluble, e.g. Ac-Di-Sol (Tradename)
Modified PVP: Crosspovidone	05.5	Crosslinked povidone, e.g. Polyplasdone XL (Tradename)





3. Part of Compression machine which holds the upper & lower punch is known as

(a) Die cavity

(b) Turrets

(c) Cam track

(d) Hopper





3. Part of Compression machine which holds the upper & lower punch is known as

(a) Die cavity

(b) Turrets

(c) Cam track

(d) Hopper





Explanation -

Hopper	For holding & feeding granulation to be compressed.
Dies	Defines the size and shape of the tablet
Punches	Used for compression of granulation with the die.
Cam track	Guide the movement of the punches.
Turrets	Hold upper and lower punches.
Feeding Machine	Used for moving granulation from the hopper to the dies.
Die table	Portion holding the dies.





4. Which type of mesh size screen is used in disintegration apparatus according to USP

(a) # 10

(b) #20

(c) #8

(d) #18





4. Which type of mesh size screen is used in disintegration apparatus according to USP

(a) # 10

(b) #20

(c) #8

(d) #18





Explanation -

COMPARISON BETWEEN DISINTEGRATION & DISSOLUTION TEST

VARIABLES	DISINTEGRATION	DISSOLUTION
Mesh screen of the bottom end of the basket	10	40
Temperature	37 ±20c	37 ±50c
Speed	28-32 CPS	50-100
Tablet remain below the surface of the liquid and descend not closer than	2.5 cm (25 mm)	2.3 -2.7 cm (23 -27 mm)
Medium (Ph 7.4)	900 ml	900 ml





5. In sugar coating _____ step is used to build up the tablet size

- (a) Sealing
- (b) Sub-coating
- (c) Syruping
- (d) Polishing





5. In sugar coating _____ step is used to build up the tablet size

(a) Sealing

(b) Sub-coating

(c) Syruping

(d) Polishing





Explanation -

SUB COATING

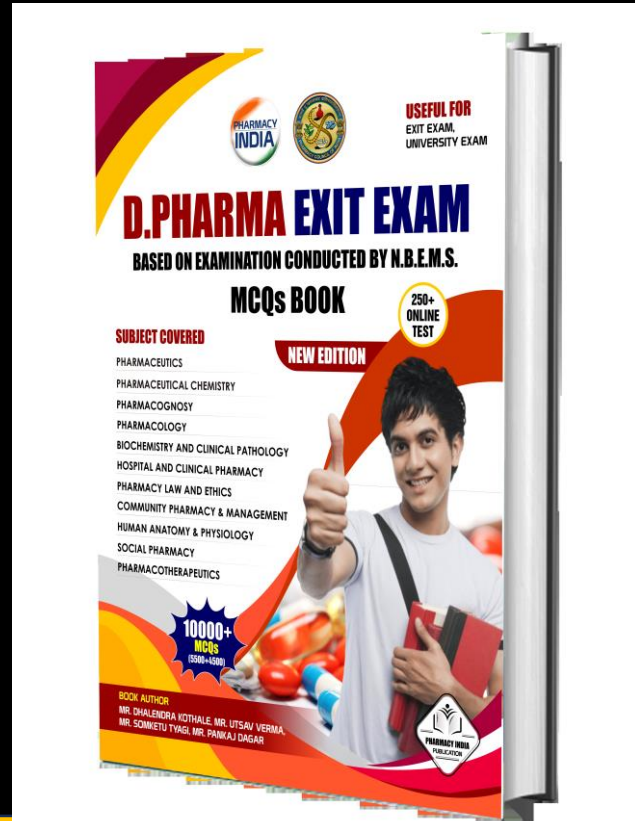
Sub coating is applied :

- ✓ To form uniform edges
- ✓ To build up the tablet size
- ✓ Sub coating increases the tablet weight from 50 to 100 percent
- ✓ **Examples** - Gelatin, sugarcane powder, corn syrup, syrup , distilled water, Gum acacia.





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6. Separation of a tablet into two or more distinct horizontal layers is

(a) Sticking

(b) Picking

(c) Lamination

(d) Capping





6. Separation of a tablet into two or more distinct horizontal layers is

(a) Sticking

(b) Picking

(c) Lamination

(d) Capping





Explanation -

LAMINATION

- ✓ Separation of a tablet into two or more distinct horizontal layers.
- ✓ Reason:
 - Air-entrapment during compression and subsequent release on ejection.
 - The condition is exaggerated by higher speed of turret.





7. _____ reduce inter particle friction and may improve the rate of flow of the tablet granulation

(a) Antiadherents

(b) Glidants

(c) Lubricants

(d) Binders





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(a) Antiadherents

(b) Glidants

(c) Lubricants

(d) Binders





Explanation -

Lubricants

- Lubricants are intended to prevent adhesion of the tablet materials to the surface of dies and punches, reduce inter particle friction and may improve the rate of flow of the tablet granulation.

LUBRICANT	PROPRIETARY NAME
Glyceryl palmitostearate	Precirol
Hydrogenated vegetable oil	Lubritab, Sterotex
PEG 4000 OR 6000	Macrogols , Carbowax
Sodium lauryl sulfate	Empicol , Stearowet

- **Example:** Lubricants- Stearic acid, Stearic acid salt – Stearic acid, Magnesium stearate, Talc, PEG (Polyethylene glycols), Surfactants





8. Maillard reaction occurs due to interaction of amine drugs with

- (a) Sucrose
- (b) Lactose
- (c) Cellulose
- (d) Satrch





8. Maillard reaction occurs due to interaction of amine drugs with

(a) Sucrose

(b) Lactose

(c) Cellulose

(d) Satrch





Explanation -

MAILLARD REACTION

- It is chemical incompatibility in between on the interaction of amine drugs with commonly used diluent lactose In the presence of a metal stearate lubricant → discoloration of tablet.
- Anhydrous lactose has the advantage over lactose it does not undergo maillard reaction.





9. As per USP the tablet weighing between weighing 130-324 mg then the % weight variation is

(a) $\pm 10\%$

(b) $\pm 7.5\%$

(c) $\pm 5\%$

(d) $\pm 2.5\%$





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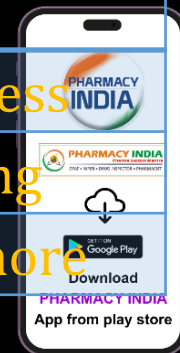




Explanation -

WEIGHT VARIATION

IP	% VARIATION	USP
Less than 85 mg	$\pm 10\%$	Weighing 130 mg or less
85mg – 250 mg	$\pm 7.5\%$	Weighing 130-324 mg
Greater than 250	$\pm 5\%$	Weighing 324 mg or more





10. ___ is the speed of friabilator used to test the friability of a tablet

(a) 10 rpm

(b) 25 rpm

(c) 50 rpm

(d) 100 rpm





10. ___ is the speed of friabilator used to test the friability of a tablet

(a) 10 rpm

(b) 25 rpm

(c) 50 rpm

(d) 100 rpm





Explanation -

Friability

- The friability test is **official in USP but not in BP and IP**
- Friability tester is known as the **Roche friabilator**
- **Tablet hardness is not an absolute indicator of strength since some formulations, when compressed into very hard tablets.**

Procedure

- Pre weighed tablet sample placed in friabilator
- Operated **100 revolution (25 rpm for 4 minutes)**
- **Dropping a tablet 6 from 6 inch height**
- **Maximum mean weight loss from the three samples of not more than 1 %**



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11. The moisture content of the capsule shell is determined by

(a) Toluene distillation method

(b) Benzene distillation method

(c) Phenol distillation method

(d) All of the above





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(a) Toluene distillation method

(b) Benzene distillation method

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Explanation -

CONDITION & SPECIFICATION OF CAPSULES

S. NO	CHARACTERISTIC	SPECIFICATION
1.	Storage condition	100 ⁰ F (35°C)
2.	Processing area temperature	22 ⁰ C
3.	Humidity (handling of empty capsule)	35-45% (In operating area)
4.	Bloom strength	150 – 250 gm .
5.	Viscosity for gelatin	25-45 milipoise
6.	Moisture content (Determine by Toluene distillation)	
	Hard gelatin capsule	12-16 %
	Soft gelatin capsule	6-10 %
7.	Disintegration test	
	Hard gelatin capsule	30 minutes
	Soft gelatin capsule	60 minutes
8.	Iron content	NMT 15 ppm





12. Identify the condition for determination of bloom strength of gelatin

(a) 4mm, 66.66 %w/w, 200C , 24 hours

(b) 4mm, 66.66 %w/w, 100C , 24 hours

(c) 4mm, 6.66 %w/w, 250 C, 20 hours

(d) 4mm, 6.66%w/w, 100 C 17hours





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(b) 4mm, 66.66 %w/w, 100C , 24 hours

(c) 4mm, 6.66 %w/w, 250 C, 20 hours

(d) 4mm, 6.66%w/w, 100 C 17hours





Explanation -

Bloom Strength (Gel strength)

- It is measured in Bloom Gelometer. It indicates strength of cross-linked gelatin molecules Le cohesive strength or firmness of the gel
- Bloom strength is in the range of **150-250 grams** is suitable for capsules.

It is determined by measuring the weight required to remove plastic plunger that is inserted **4 mm into 6.66% gelatin solution at 10°C for 17 hours**





13. Identify the correct steps for of empty gelatin shell

- (a) Dipping → Spinning → Drying → Stripping →
Trimming → Joining → Polishing
- (b) Dipping → Spinning → Stripping → Drying →
Trimming Joining → Polishing
- (c) Dipping → Spinning → Drying → Stripping →
Joining → Trimming → Polishing
- (d) Spinning Dipping → Drying → Stripping →
Trimming → Joining → Polishing





13. Identify the correct steps for of empty gelatin shell

- (a) Dipping → Spinning → Drying → Stripping → Trimming → Joining → Polishing
- (b) Dipping → Spinning → Stripping → Drying → Trimming Joining → Polishing
- (c) Dipping → Spinning → Drying → Stripping → Joining → Trimming → Polishing
- (d) Spinning Dipping → Drying → Stripping → Trimming → Joining → Polishing





Explanation -

STEPS	DESCRIPTION
Dipping	Temperature of pins = 22° C Solution temperature = 50° C Time required= 12 seconds.
Spinning	Pins are rotated to distribute the gelatin uniformly around the pins
Drying	By use of dry air and dehumidification
Stripping	By bronze jaws
Trimming	By stationery knives
Joining	Cap and body are joined Polishing by the polymer
Polishing	The entire cycle of machine lasts approximately 45 min.

The entire cycle of machine lasts approximately 45 min





14. The entire cycle of the capsule shell manufacturing lasts for

(a) 30 minutes

(b) 90 minutes

(c) 45 minutes

(d) 60 minutes





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(a) 30 minutes

(b) 90 minutes

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Explanation -

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Joining	Cap and body are joined Polishing by the polymer
	The entire cycle of machine lasts approximately 45 min.





15. Which is a polishing machine of finished capsule

(a) ROTOSORT

(b) PM-60

(c) VERICAP-4000

(d) ACCOFIL





15. Which is a polishing machine of finished capsule

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(b) PM-60

(c) VERICAP-4000

(d) ACCOFIL





Explanation -

EQUIPMENTS USED IN CAPSULE FORMULATION

S. NO.	EQUIPMENTS	PURPOSE
1.	Rotofill	For filling of pellets
2.	Rotosort	New filled capsuk sorting machine
3.	Rotoweigh	Automatic capsuke weighing machine
4.	Vericap-1200	Capsule weighing machine
5.	Quali-seal	Filling of liquids
6.	Erweka KEA	Dusting and Polishing machine
7.	Seidenader PM60	For Cleaning & Polishing.





16. Green bones are used for the preparation of gelatin of the type

(a) A

(b) C

(c) B

(d) A and B





16. Green bones are used for the preparation of gelatin of the type

(a) A

(b) C

(c) B

(d) A and B





Explanation -

TYPE OF GELATIN			
TYPE	SOURCE	PROCESSING	ISOELECTRIC POINT
Type A	Pork Skin	Acid processed	pH - 9
Type B	Bones	Alkali processed	Ph - 4.7





17. The limit for iron content of gelatin in capsule manufacturing is

(a) NMT 5ppm

(b) NMT 25 ppm

(c) NLT 15ppm

(d) NMT 15ppm





17. The limit for iron content of gelatin in capsule manufacturing is

(a) NMT 5ppm

(b) NMT 25 ppm

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Explanation -

CONTIDITION & SPECIFICATION OF CAPSULES

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1.	Storage condition	100 ⁰ F (35°C)
2.	Processing area temperature	22 ⁰ C
3.	Humidity (handling of empty capsule)	35-45% (In operating area)
4.	Bloom strength	150 – 250 gm .
5.	Viscosity for gelatin	25-45 milipoise
6.	Moisture content (Determine by Toluene distillation)	
	Hard gelatin capsule	12-16 %
	Soft gelatin capsule	6-10 %
7.	Disintegration test	
	Hard gelatin capsule	30 minutes
	Soft gelatin capsule	60 minutes
8.	Iron content	NMT 15 ppm





18. Formalin treatment is given to capsule shell

- (a) To decrease solubility
- (b) To increase bulkiness
- (c) To prevent microbial attack
- (d) To avoid stickiness





18 Formalin treatment is given to capsule shell

(a) To decrease solubility

(b) To increase bulkiness

(c) To prevent microbial attack

(d) To avoid stickiness





Explanation -

FOLLOWING ARE THE COMPOSITION OF SOFT GELATIN CAPSULE

INGREDIENTS	FUNCTION/PURPOSE
Gelatin	Ideal substance for capsulation
Plasticizer (Glycerin USP, Sorbitol USP, and Pharmaceutical Grade sorbitol special their combination)	Enhances its flexibility and to help its processing and ratio of dry plasticizer to dry gelatin measures the hardness of the capsule shell
Preservative (Methylparaben: propylparaben (4:1), sorbic acid (0.2%))	Prevent the growth of micro-organism
Water-soluble dyes, certified lakes, pigments	Colorants
Titanium dioxide	Opacifier
ethyl vanillin, essential oils	Flavoring agent
Fumaric acid	To aid solubility and 1% fumaric acid aids to increase the acid solubility and reduces the aldehyde tanning of gelatin
Formaldehyde (Formalin)	Retards dissolution of gelatin shell





19. Name of the instrument which is associated with filling HPMC capsules

(a) Elancofil

(b) Rotofil

(c) Rotosort

(d) Quali-V





19. Name of the instrument which is associated with filling HPMC capsules

(a) Elancofil

(b) Rotofil

(c) Rotosort

(d) Quali-V





Explanation -

MODEL	TYPES OF MATERIAL USED
Accogel	Equipment that accurately fills powdered dry solids into soft gelatin shell. Preparation of soft gelatin capsules involving filling of both granules and powder
Accofill	Fill exact powder dose in hard gelatin capsule
Rotofill	Machine supplied by Eli Lilly is a special machine used to fill pellets in hard gelatin capsules
Rotosort	Newly filled capsule sorting machine sold by Eli Lilly & Company
Rotoweigh	A high speed capsule weighing machine sold by Eli Lilly & Company
Erweka KEA	The dedusting and polishing machine for hard gelatin capsules is sold by Ke industries.
Quali-V	QUALI-V, developed by Shionogi Qualicaps, is the first HPMC capsule developed for eventual use in pharmaceutical products.





20. Bronze jaws are used in _____ process

(a) Dipping

(b) Trimming

(c) Drying

(d) Stripping





20. Bronze jaws are used in _____ process

(a) Dipping

(b) Trimming

(c) Drying

(d) Stripping





Explanation -

STEPS	DESCRIPTION
Dipping	Temperature of pins = 22° C Solution temperature = 50° C Time required= 12 seconds.
Spinning	Pins are rotated to distribute the gelatin uniformly around the pins
Drying	By use of dry air and dehumidification
Stripping	By bronze jaws
Trimming	By stationery knives
Joining	Cap and body are joined Polishing by the polymer
Polishing	The entire cycle of machine lasts approximately 45 min.



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21. What is the chemical degradation order of Pharmaceutical suspensions

- (a) First order
- (b) Second order.
- (c) Pseudo first order.
- (d) Zero order





21. What is the chemical degradation order of Pharmaceutical suspensions

- (a) First order
- (b) Second order.
- (c) Pseudo first order.
- (d) Zero order





Explanation -

KINETICS OF DRUGS DECOMPOSITION

- A drug in suspension follows apparent zero order kinetics in which the concentration of the drug in the solution remains constant with time.
- When the drug in the solution degrades or is lost by any means, new drug molecules from the suspended solid particles dissolve in the solution to keep the concentration constant at the equilibrium solubility.
- That is, the solid suspended particles act as a reservoir of drugs.





22. Identify the wrong match pattern of DLVO theory

- (a) Primary minimum, High attraction, Irreversible coagulation
- (b) Primary maximum, High repulsion, Prevents coagulation
- (c) Secondary minimum, Weak interaction, Flocculation
- (d) None of the above.





22. Identify the wrong match pattern of DLVO theory

- (a) Primary minimum, High attraction, Irreversible coagulation
- (b) Primary maximum, High repulsion, Prevents coagulation
- (c) Secondary minimum, Weak interaction, Flocculation
- (d) None of the above.





Explanation -

Deryaguin, Landau, Verwey and Overbeek recognized the concept of balance between electrostatic repulsive and van der Waals attractive forces between particles.

ZONE	INDICATE	EFFECT ON FORMULATION
Primary minimum	High attraction	Irreversible coagulation
Primary maximum	High repulsion	Prevents coagulation
Secondary minimum	Weak attraction	Flocculation





23. Methylcellulose is a ___ type of polymer

- (a) Anionic
- (b) Amphilytic
- (c) Cationic
- (d) Non-ionic





23. Methylcellulose is a ___ type of polymer

- (a) Anionic
- (b) Amphilytic
- (c) Cationic
- (d) Non-ionic





Explanation -

Examples of Hydrocolloids

Non-ionic	Anionic	Clays
Methylcellulose, HPMC	Sodium CMC, Polyacrylic acid (Carbopol)	Bentonite





24. For an ideal Suspension, the sedimentation volume should be

- (a) Equal to 1
- (b) Less than 1
- (c) More than 1
- (d) Zero





24. For an ideal Suspension, the sedimentation volume should be

- (a) Equal to 1
- (b) Less than 1
- (c) More than 1
- (d) Zero





Explanation -

Sedimentation volume is a ratio of the ultimate **volume of sediment** (V_u) to the original **volume of sediment** (V_o) before settling.

F = final volume of sediment (V_u) / Initial volume of sediment (V_o).

$F \rightarrow$ dimensionless

$F = 0$ (complete sedimentation)

$F = 1$ (no sedimentation)

Increase in sedimentation volume, increases physical stability.





25. Stoke's formula for sedimentation velocity V is given by

(a) $D^2(\rho_1 - \rho_2)g / 18\eta$

(b) $D^2(\rho_1 + \rho_2)g / 18\eta$

(c) $D^2(\rho_1 + \rho_2)g / 9\eta$

(d) $D^2(\rho_1 - \rho_2)g / 9\eta$





25. Stoke's formula for sedimentation velocity V is given by

(a) $D^2(\rho_1 - \rho_2)g / 18\eta$

(b) $D^2(\rho_1 + \rho_2)g / 18\eta$

(c) $D^2(\rho_1 + \rho_2)g / 9\eta$

(d) $D^2(\rho_1 - \rho_2)g / 9\eta$





Explanation -

STOKES LAW

$$v = 2r^2(\rho_1 - \rho_2)g / 9\eta = D^2(\rho_1 - \rho_2)g / 18\eta$$

Where,

v=Velocity of sedimentation in cm/s; particle radius

D= Particle diameter in cm.

ρ_1 and ρ_2 , Density of the particle and the liquid respectively, in g/ml

g= Gravitational constant 980.7 cm s^{-2} and

n= Viscosity of the medium in poise. i.e. $\text{g cm}^{-1} \text{ s}^{-1}$ in cgs units.





26. The principal limiting factor in the rate of absorption from suspensions is

- (a) Dissolution rate
- (b) Viscosity
- (c) Physical stability
- (d) Suspending agent





26. The principal limiting factor in the rate of absorption from suspensions is

(a) Dissolution rate

(b) Viscosity

(c) Physical stability

(d) Suspending agent





Explanation -

The drug released from suspensions is mainly through dissolution. Suspensions share many physicochemical characteristics of tablets & capsules, with respect to the process of dissolution. As tablets and capsules disintegrate into powders and form suspensions in the biological fluids, **it can be said that they share the dissolution process as a rate limiting step for absorption and bio-availability.**





27. In the suspensions, for stability considerations

- (a) Agglomeration are preferred
- (b) Floccs are preferred
- (c) Form hard cake
- (d) None of the above





27. In the suspensions, for stability considerations

(a) Agglomeration are preferred

(b) Floccs are preferred

(c) Form hard cake

(d) None of the above





Explanation -

- Flocculation is the formation of flocs, i.e., light, fluffy groups of particles held together by weak Van der Waal's forces.
- They cause increase in sedimentation rate due to increase in size of sedimenting particles, hence particles in flocculated suspensions in war sediment more rapidly.
- Particles of flocculated suspensions, like tufts of wool with a loose fibrous structure, also contain an appreciable amount of entrapped liquid, so that the volume of final sediment is relatively large and hence, it does not form a hard cake at the bottom of the container and is easily dispersed by gentle agitation; therefore, a flocculated suspension is pharmaceutically more accepted as compared to deflocculated suspension.





28.

Cake formation is the characteristic feature of:

- (a) Flocculated suspensions**
- (b) Deflocculated suspensions**
- (c) Thixotropic suspensions**
- (d) Structured suspensions**





28.

Cake formation is the characteristic feature of:

(a) Flocculated suspensions

(b) Deflocculated suspensions

(c) Thixotropic suspensions

(d) Structured suspensions





Explanation -

Deflocculated suspension-

- Solids are present as single entities.
- Shorter half-life, greater bioavailability.
- Low sedimentation rate.
- Hard to redisperse (hard cake).
- Particles experiences repulsive forces.
- Pleasant appearances because of uniform dispersion of particles
- Cloudy supernatant.





29.

The zeta potential of a suspension is reduced below a certain value, the attraction of particle leads to:

(a) De-flocculation

(b) Flocculation

(c) Sedimentation

(d) Precipitation





29.

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Explanation -

- The zeta potential of a suspension is reduced below a certain value, the attraction of particle leads to flocculation.
- When the flocculation of a stable suspension is brought about by a decrease in zeta potential, both settling-rate and sedimentation-volume increase as zeta potential approaches zero.
- **Flocculation-**
 - Particles form loose aggregates and form a net work like structure.
 - The rate of sedimentation is high.
 - Better physical stability and less bioavailability.
 - Easy to re-disperse (Loose cake).
 - Particles experiences attractive forces.





30.

Structured vehicle is included in the formulation of a suspension in order to

- (a) Decrease the interfacial tension**
- (b) Prevent the caking of the sediment**
- (c) Prevents the sedimentation of particles**
- (d) Reduce the size by chemical means**





30.

Structured vehicle is included in the formulation of a suspension in order to

(a) Decrease the interfacial tension

(b) Prevent the caking of the sediment

(c) Prevents the sedimentation of particles

(d) Reduce the size by chemical means





Explanation -

- Structured vehicles are also called thickening or suspending agents.
- They are aqueous solutions of natural and synthetic gums.
- It is applicable only to deflocculated suspensions.
- **Examples** – methyl cellulose, sodium carboxy methyl cellulose, acacia, gelatin, tragacanth, glycerine.
- These structured vehicle entrapped the particle and reduces the sedimentation of particles.
- Thus, the use of deflocculated particles in a structured vehicle may form solid hard cake upon long storage.



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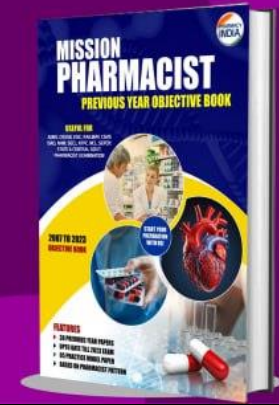
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