FPS Pharmaceutical Sciences Exam 5 Practice (Sample)

Study Guide

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Questions

1. What does therapeutic drug monitoring primarily aim to achieve?

A. Improving patient satisfaction

B. Maintaining a constant drug concentration in the bloodstream

C. Identifying cost-effective therapies

D. Reducing medication errors

2. Why is CU preferred over WV uniformity in solid dosage forms?

A. CU provides comparative analysis only

B. CU provides actual measures of drug content per dosage unit

C. CU is less expensive to measure

D. CU requires less time for testing

3. What is the primary function of a Quality Control (QC) laboratory?

A. To manufacture drugs

B. To design new drugs

C. To test samples to ensure they meet quality standards

D. To oversee marketing strategies

4. What is the function of glidants in powder mixtures?

A. Improve permeability

B. Reduce interparticle interactions

C. Enhance the stability of APIs

D. Increase viscosity

5. What role do plasticizers play in film coatings?

A. Enhance adhesion

B. Impart flexibility

C. Reduce cost

D. Increase gloss

6. What is the main role of excipients in pharmaceutical formulations?

- **A. Activate the drug potency**
- **B. Facilitate drug delivery**
- **C. Improve the taste of medications**
- **D. Increase the cost of production**

7. What is the primary role of lubricants in pharmaceutical formulations?

- **A. Enhance flavor and taste**
- **B. Improve solubility of active ingredients**
- **C. Reduce friction between particles and machine parts**
- **D. Stabilize emulsions**

8. Compressibility is primarily influenced by which aspect of the material?

- **A. The solid fraction (or porosity) and compaction pressure**
- **B. The tensile strength and tablet thickness**
- **C. The moisture content and temperature**
- **D. The size of the powder particles**

9. Which drug release system controls the release in an "intentional" pattern?

- **A. Sustained release**
- **B. Modified release**
- **C. Controlled release**
- **D. Immediate release**

10. The onset of action for buccal tablets is typically compared to which other form of medication administration?

- **A. Intravenous**
- **B. Oral**
- **C. Topical**
- **D. Subcutaneous**

Answers

1. B
2. B
3. C
4. B
5. B
6. B
7. C
8. A
9. C
10. B

Explanations

1. What does therapeutic drug monitoring primarily aim to achieve?

A. Improving patient satisfaction

B. Maintaining a constant drug concentration in the bloodstream

C. Identifying cost-effective therapies

D. Reducing medication errors

Therapeutic drug monitoring primarily aims to maintain a constant drug concentration in the bloodstream, which is essential for optimizing the pharmacotherapeutic effects of medication while minimizing toxicity. By regularly measuring drug levels in the patient's blood, healthcare providers can ensure that drug concentrations remain within a therapeutic range. This is particularly important for medications with a narrow therapeutic index, where small changes in dosage can lead to ineffective treatment or harmful side effects. Implementing therapeutic drug monitoring allows clinicians to adjust dosages based on individual patient responses, considering factors such as metabolism, age, weight, and comorbid conditions. Ultimately, this practice enhances the effectiveness and safety of drug therapy by ensuring that patients receive the most appropriate dosing for their specific needs.

2. Why is CU preferred over WV uniformity in solid dosage forms?

A. CU provides comparative analysis only

B. CU provides actual measures of drug content per dosage unit

C. CU is less expensive to measure

D. CU requires less time for testing

The preference for CU over WV uniformity in solid dosage forms is due to CU's ability to provide actual measures of drug content per dosage unit. This approach is crucial for ensuring that each individual dosage unit contains the specified amount of the active pharmaceutical ingredient, allowing for a more accurate assessment of the drug's consistency and effectiveness across different dosages. When solid dosage forms are evaluated using content uniformity (CU), the actual concentration of the drug in each unit is measured, which helps to affirm that the formulation is within specified limits for active ingredient content. This is especially important in maintaining the safety and efficacy of medications, as variances in drug content can lead to significant therapeutic failures or adverse effects. In contrast, weight variation (WV) only assesses the weight of dosage forms without providing insights into the actual drug content. While WV can indicate uniformity, it does not ensure that the active ingredient is present in adequate amounts, which is critical for therapeutic outcomes. Thus, the comparative nature of WV testing does not offer the same level of assurance regarding individual dosage unit potency as CU does. Given these considerations, CU stands out as the more reliable measure for quality assurance in manufacturing solid dosage forms.

3. What is the primary function of a Quality Control (QC) laboratory?

A. To manufacture drugs

B. To design new drugs

C. To test samples to ensure they meet quality standards

D. To oversee marketing strategies

The primary function of a Quality Control (QC) laboratory is to test samples to ensure they meet quality standards. QC is crucial in the pharmaceutical industry, as it involves evaluating the quality, safety, and efficacy of drugs throughout the manufacturing process. This includes rigorous testing of raw materials, in-process samples, and finished products to confirm that they meet predetermined specifications and regulatory requirements. A robust QC process ensures that medications are safe for consumer use and that they maintain their intended therapeutic effects. When considering the other options, manufacturing drugs and designing new drugs are functions typically associated with production and research and development, respectively, but do not fall under the QC laboratory's primary role. Similarly, overseeing marketing strategies relates more to business operations rather than the scientific and regulatory focus of quality control. Hence, the emphasis on testing samples to verify quality standards encapsulates the essence of what QC laboratories are established to accomplish.

4. What is the function of glidants in powder mixtures?

A. Improve permeability

B. Reduce interparticle interactions

C. Enhance the stability of APIs

D. Increase viscosity

Glidants serve a crucial role in enhancing the flow characteristics of powder mixtures by reducing interparticle interactions. These materials are added to powders to promote better flowability by minimizing friction and cohesion between particles. When powders are processed, especially in tablet manufacturing, poor flow can lead to inconsistent tablet weights and difficulties in achieving uniformity during compaction. Glidants, such as silica or talc, create a smoother surface on the particles and can help in promoting the movement of particles past one another, thereby improving the overall handling characteristics of the powder blend. This property is particularly important in ensuring that the final dosage form has consistent physical attributes and performance, making the use of glidants fundamental in pharmaceutical formulations.

5. What role do plasticizers play in film coatings?

A. Enhance adhesion

B. Impart flexibility

C. Reduce cost

D. Increase gloss

Plasticizers serve a critical role in enhancing the flexibility of film coatings applied to pharmaceutical tablets and capsules. By incorporating plasticizers into the coating formulation, the overall modulus of the polymer material is lowered, which results in a softer, more pliable film. This flexibility is crucial because it allows the film to withstand mechanical stresses during production, packaging, and handling without cracking or peeling away from the substrate. In addition to providing flexibility, plasticizers can also improve the film's processability, enabling smoother application and more uniform coatings. Moreover, a flexible film coating can lead to improved performance attributes, such as better drug release characteristics and enhanced stability. The increased flexibility ensures that the film can accommodate changes in the physical state of the drug product, such as expansion or contraction due to temperature variations. While plasticizers may indirectly affect other properties like gloss or adhesion, their primary function is to impart flexibility, making them essential in the development of effective and reliable film coatings in the pharmaceutical industry.

6. What is the main role of excipients in pharmaceutical formulations?

A. Activate the drug potency

B. Facilitate drug delivery

C. Improve the taste of medications

D. Increase the cost of production

Excipients play a crucial role in pharmaceutical formulations primarily by facilitating drug delivery. They are inactive substances that serve as the medium for the drug, ensuring that the therapeutic compound is delivered effectively to the intended site of action in the body. Excipients can enhance the solubility, stability, and bioavailability of the active pharmaceutical ingredient (API), making it easier for the body to absorb and utilize the medication. For instance, excipients can act as fillers or binders in solid dosage forms, aiding in the compaction and stability of tablets. They can also include surfactants that improve the solubility of poorly soluble drugs or preservatives that prolong the shelf-life of liquid formulations. By optimizing the formulation, excipients ensure that the drug performs as intended when administered to patients. The other options, while they may describe some of the impacts or functions of certain excipients, do not capture the primary role as accurately as the selected choice does. Excipient functions like taste masking or potentially increasing production costs are secondary considerations in the broader context of how excipients are used to enhance delivery and efficacy of the active ingredients in various forms of medication.

7. What is the primary role of lubricants in pharmaceutical formulations?

A. Enhance flavor and taste

B. Improve solubility of active ingredients

C. Reduce friction between particles and machine parts

D. Stabilize emulsions

Lubricants play a crucial role in pharmaceutical formulations primarily by reducing friction between particles and machine parts during the manufacturing process. This function is essential in the production of tablets and capsules, as it ensures a smooth flow of powder blends through processing equipment. When the friction is minimized, it helps to prevent issues such as sticking, caking, or clumping of powders, which can adversely affect the uniformity and quality of the final product. A well-formulated lubricant contributes to the efficiency of the compression process; it allows for easier ejection of tablets from the die, thereby improving manufacturing speed and reducing wear and tear on machinery. Proper lubrication is key to enhancing the overall performance of both the formulation and the equipment used in its production, ensuring that high-quality pharmaceutical products are consistently produced.

8. Compressibility is primarily influenced by which aspect of the material?

A. The solid fraction (or porosity) and compaction pressure

B. The tensile strength and tablet thickness

C. The moisture content and temperature

D. The size of the powder particles

Compressibility in pharmaceutical materials, particularly powders, is primarily influenced by the solid fraction (or porosity) and compaction pressure. When discussing compressibility, it refers to the ability of a powder to decrease in volume under pressure. The solid fraction indicates how densely packed the particles are in a given volume, which directly affects how much space is available for the particles to rearrange when subjected to compaction. High porosity generally leads to higher compressibility because more air is trapped within the powder bed, offering more voids for particles to collapse into under pressure. Compaction pressure also plays a crucial role, as higher pressures encourage particles to come closer together, leading to increased contact points and interaction between particles. This results in a denser product and significantly affects the final mechanical properties of the compressed tablet. While the other factors listed in the other options can influence certain properties of powders or tablets, they do not primarily drive the compressibility as effectively as the combination of solid fraction and compaction pressure does. For example, moisture content and temperature can affect the flowability and cohesion of powders but are secondary to the fundamental interactions highlighted in the correct answer.

9. Which drug release system controls the release in an "intentional" pattern?

A. Sustained release

B. Modified release

C. Controlled release

D. Immediate release

The term "controlled release" refers to drug release systems designed to release a medication at a predetermined rate, over a specified period, and in a targeted manner. This intentional pattern of drug release is aimed at achieving a more consistent therapeutic effect, maximizing efficacy while minimizing side effects. Controlled release formulations can adjust the rate of drug release based on various factors such as time, pH, or the concentration gradient. This type of release system is particularly valuable in conditions where maintaining a constant drug level in the bloodstream is essential for the effectiveness of treatment. With controlled release, fluctuations in drug concentration are minimized, leading to better patient adherence and improved therapeutic outcomes. In contrast, sustained release refers to prolonged action but may not be as precisely controlled regarding the release rate as a controlled release system. Modified release encompasses a broader range of release mechanisms, not all of which require a strict control of the release pattern. Immediate release, on the other hand, results in the rapid availability of the drug, which does not align with the concept of intentional control over the release pattern. Thus, controlled release systems specifically emphasize the intentional manipulation of the drug release profile, making it the correct choice.

10. The onset of action for buccal tablets is typically compared to which other form of medication administration?

A. Intravenous

B. Oral

C. Topical

D. Subcutaneous

Buccal tablets are designed to be placed between the gum and cheek, where they dissolve and release medication that is absorbed through the mucous membranes into the bloodstream. This method of administration bypasses the digestive system, allowing for a quicker onset of action compared to traditional oral tablets that must first be swallowed, dissolved, and absorbed through the gastrointestinal tract. When comparing buccal tablets to oral medication, the onset of action for buccal absorption is generally faster because the drug enters systemic circulation more rapidly. This is particularly beneficial for medications that need to work quickly, as it reduces the time it takes for the drug to start producing effects. In contrast, oral medications usually have a longer onset of action due to the processing involved in digestion and absorption. The comparison with intravenous, topical, and subcutaneous administrations involves different mechanisms of absorption and is usually associated with variable onset times. Intravenous administration offers immediate onset but is not comparable in terms of route or patient experience. Topical administration also has a local effect with variable absorption rates, and subcutaneous injections, while typically quicker than oral medications, do not match the buccal route's speed in onset for certain formulations. Therefore, buccal tablets are most aptly compared to oral medications regarding