

HOSA Biotechnology Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

SAMPLE

- 1. A flask with a bulbous bottom is best suited for what type of work?**
 - A. Mixing solid substances**
 - B. Heating and distillation**
 - C. Pouring liquids**
 - D. Observation of reactions**
- 2. What is a scalpel primarily used for?**
 - A. Measuring liquid volumes**
 - B. Holding samples securely**
 - C. Dissection and surgery**
 - D. Culturing microorganisms**
- 3. Which aspect of a Standard Operating Procedure defines the extent of the procedure's application?**
 - A. Definitions**
 - B. Scope**
 - C. Revisions**
 - D. Procedures**
- 4. Which role does not typically require time spent in a lab setting among those listed?**
 - A. Quality control analyst**
 - B. Public relations representative**
 - C. Laboratory technician**
 - D. Research scientist**
- 5. What is the primary use of a micropipet tip?**
 - A. To protect the micropipet from contamination**
 - B. To enhance optical quality**
 - C. To facilitate easier dispensing of liquids**
 - D. To hold samples at a controlled temperature**

- 6. Which term describes a nucleotide that serves as an energy storage molecule?**
- A. Ribose**
 - B. Adenosine triphosphate**
 - C. Deoxyribonucleic acid**
 - D. RNA**
- 7. What is the role of lysosomes in a cell?**
- A. Membrane-bound structures that synthesize proteins**
 - B. Responsible for the breakdown of cellular wastes**
 - C. Helps in energy production**
 - D. Regulates cellular movement**
- 8. What is one primary use of a disposable plastic transfer pipette?**
- A. Measuring exact volumes**
 - B. Transferring small amounts of liquid**
 - C. Heating liquids**
 - D. Mixing solutions**
- 9. What type of safety equipment is a full face shield used for?**
- A. To protect against extreme temperatures**
 - B. To protect the user's entire face from flying objects and chemical splashes**
 - C. To sterilize instruments**
 - D. To measure concentrations of liquids**
- 10. Which of the following molecules contains the instructions to make proteins?**
- A. Glucose**
 - B. Chlorophyll**
 - C. mRNA**
 - D. DNA**

Answers

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

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Explanations

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1. A flask with a bulbous bottom is best suited for what type of work?

A. Mixing solid substances

B. Heating and distillation

C. Pouring liquids

D. Observation of reactions

A flask with a bulbous bottom is particularly well-suited for heating and distillation due to its unique shape. The bulbous design allows for even heat distribution, which is essential for processes that require gentle or uniform heating. This is especially important in distillation, where precise temperature control is necessary to separate components based on their boiling points. The shape also provides a sufficient surface area for liquid to boil, while the narrow neck of the flask helps to minimize the loss of vapor during the distillation process. This efficiency in heating and vapor collection is not as effectively achieved with flasks designed specifically for mixing or observation, making the bulbous flask the ideal choice for these types of applications.

2. What is a scalpel primarily used for?

A. Measuring liquid volumes

B. Holding samples securely

C. Dissection and surgery

D. Culturing microorganisms

A scalpel is primarily used in dissection and surgery due to its design and functionality. It features a sharp blade that allows for precise cuts, which is essential in surgical procedures for incising skin, tissues, and organs with accuracy. This precision is crucial in both medical surgeries and biological dissections, where detailed and careful manipulation of tissues is required. In contrast, the other options represent tools or instruments designed for different functions. Measuring liquid volumes would typically involve pipettes or graduated cylinders, while holding samples securely is the role of forceps or clamps. Culturing microorganisms is accomplished using Petri dishes or culture flasks, which provide the appropriate environment for growth. Each of these tasks requires specialized equipment tailored to their specific purposes, reinforcing the scalpel's unique role in the context of surgery and dissection.

3. Which aspect of a Standard Operating Procedure defines the extent of the procedure's application?

A. Definitions

B. Scope

C. Revisions

D. Procedures

The correct choice, which identifies the aspect of a Standard Operating Procedure (SOP) that defines the extent of the procedure's application, is the scope. The scope section of an SOP clearly outlines the boundaries within which the procedure is applicable. It specifies what is included in the procedure, such as the departments, processes, or areas of activity it covers, and often indicates any limitations or constraints related to the procedure's use. By detailing the application range, the scope helps users understand when and where the SOP should be utilized. This is crucial for ensuring the procedure is applied correctly and uniformly across relevant situations. In contrast, other sections such as definitions provide clarity on terminologies used, revisions refer to updates made to the document, and procedures outline the specific steps to be followed, but they do not define the extent of application like the scope does.

4. Which role does not typically require time spent in a lab setting among those listed?

A. Quality control analyst

B. Public relations representative

C. Laboratory technician

D. Research scientist

The role of a public relations representative does not typically require time spent in a lab setting. Public relations professionals focus on managing communications, promoting the organization's image, and interacting with the media and the public. Their work is primarily conducted in office environments where they develop strategies for outreach and communication rather than in laboratories conducting experiments or technical analyses. In contrast, individuals in roles such as quality control analysts, laboratory technicians, and research scientists are deeply involved in laboratory work. Quality control analysts conduct tests and analyses to ensure that products meet specific standards, laboratory technicians perform hands-on experiments and assist in research, and research scientists design and carry out experiments to advance knowledge in their field. These positions are inherently linked to laboratory settings, where specific skills and techniques are applied.

5. What is the primary use of a micropipet tip?

- A. To protect the micropipet from contamination**
- B. To enhance optical quality**
- C. To facilitate easier dispensing of liquids**
- D. To hold samples at a controlled temperature**

The primary use of a micropipet tip is to protect the micropipet from contamination. When utilizing a micropipet for liquid handling in a laboratory setting, the tip acts as a barrier between the liquid being pipetted and the micropipet itself. This is particularly important in maintaining the integrity of samples and preventing cross-contamination between different substances. By using disposable tips, any potentially harmful or reactive liquid is kept away from the main unit of the micropipet, ensuring that subsequent samples remain uncontaminated and that the accuracy of measurements is upheld. Other options mention functionalities such as enhancing optical quality, facilitating easier dispensing of liquids, or controlling temperature. While tips can help with dispensing due to their design, it is primarily their role in contamination prevention that is most critical in laboratory practices, making the correct choice revolve around protecting the micropipet and samples.

6. Which term describes a nucleotide that serves as an energy storage molecule?

- A. Ribose**
- B. Adenosine triphosphate**
- C. Deoxyribonucleic acid**
- D. RNA**

Adenosine triphosphate (ATP) is the term that refers to a nucleotide that acts as an energy storage molecule. It is composed of three phosphate groups, a ribose sugar, and an adenine base. The high-energy bonds between the phosphate groups in ATP are crucial because when these bonds are broken, energy is released, which can then be used by cells to perform various functions, such as muscle contraction, nerve impulse propagation, and biochemical reactions. In contrast, ribose is merely a sugar component of RNA and ATP, but it does not function as an energy molecule on its own. Deoxyribonucleic acid (DNA) is the genetic material that stores and transmits genetic information, and while its structure includes nucleotides, it does not serve the role of energy storage directly. RNA is a nucleic acid involved in protein synthesis and also does not primarily function as an energy storage molecule like ATP. Thus, ATP stands out as the critically important nucleotide for cellular energy transfer and metabolism.

7. What is the role of lysosomes in a cell?

- A. Membrane-bound structures that synthesize proteins
- B. Responsible for the breakdown of cellular wastes**
- C. Helps in energy production
- D. Regulates cellular movement

Lysosomes play a crucial role in cellular maintenance and waste management. They are membrane-bound organelles that contain enzymes specifically designed to break down various biological macromolecules, including proteins, lipids, carbohydrates, and nucleic acids. These enzymes are referred to as hydrolytic enzymes, and they function optimally in the acidic environment maintained within lysosomes. When cellular components or external materials are no longer needed, or when they become damaged, lysosomes engulf these substances in a process called autophagy or through phagocytosis, effectively degrading them into simpler molecules. This process not only helps in recycling cellular components but also eliminates potentially harmful materials, thereby maintaining cellular health and homeostasis. The other options refer to functions that are characteristic of different cellular structures: for instance, protein synthesis is primarily the role of the ribosomes and the endoplasmic reticulum, energy production is chiefly handled by mitochondria, and cellular movement is regulated by cytoskeletal elements. Thus, the specific function of lysosomes as the site of breakdown and recycling of cellular waste distinguishes their role in the cellular ecosystem.

8. What is one primary use of a disposable plastic transfer pipette?

- A. Measuring exact volumes
- B. Transferring small amounts of liquid**
- C. Heating liquids
- D. Mixing solutions

One primary use of a disposable plastic transfer pipette is to transfer small amounts of liquid. These pipettes are designed for convenience and ease of use, making them ideal for transferring liquids in laboratory settings. They are particularly useful when precision is less critical than the need for quick and contamination-free handling of samples, such as when performing reactions, dilutions, or simple liquid transfers. Their disposable nature also ensures that there's minimal risk of cross-contamination between samples, which is crucial in many laboratory protocols. Measuring exact volumes is generally not the primary function of transfer pipettes; rather, they provide a way to grab small amounts of liquid quickly. Heating liquids is not applicable to pipettes, as this function is typically executed using specialized equipment like Bunsen burners or hot plates. Mixing solutions is generally done using vortex mixers or stirring rods, as transfer pipettes do not have the mechanism to effectively combine solutions.

9. What type of safety equipment is a full face shield used for?

- A. To protect against extreme temperatures**
- B. To protect the user's entire face from flying objects and chemical splashes**
- C. To sterilize instruments**
- D. To measure concentrations of liquids**

A full face shield is specifically designed to provide comprehensive protection for the user's entire face, which includes the eyes, nose, and mouth. This type of safety equipment is particularly important in environments where there is a risk of exposure to hazardous materials, such as chemical splashes or flying particles. The design of a full face shield allows it to cover all facial areas, effectively shielding them from potential hazards that could cause injury or contamination. In laboratory and industrial settings, workers often use full face shields in combination with other personal protective equipment, such as safety goggles and gloves, to ensure complete safety while handling substances that could be harmful. This protective gear is essential in situations where splashes are likely, such as working with corrosive chemicals, which emphasizes its role in safeguarding the wearer's face from both chemical exposure and physical impact. The other options provided do not accurately describe the primary function of a full face shield, thus highlighting its specialized use for protection in hazardous situations.

10. Which of the following molecules contains the instructions to make proteins?

- A. Glucose**
- B. Chlorophyll**
- C. mRNA**
- D. DNA**

The molecule that contains the instructions to make proteins is mRNA, or messenger RNA. During the process of transcription, genetic information from DNA is copied into mRNA. This mRNA then serves as the template for translation, where ribosomes read the sequence of codons in the mRNA to assemble amino acids into proteins. In this context, while DNA is the original blueprint containing all the genetic instructions, it is mRNA that directly conveys these instructions to the ribosomes for protein synthesis. So, mRNA is central to the process, as it facilitates the transfer of information from the DNA in the nucleus to the ribosomes in the cytoplasm, where proteins are synthesized. Other molecules like glucose and chlorophyll do not play a direct role in encoding instructions for making proteins. Glucose is a simple sugar that serves as an energy source, and chlorophyll is involved in photosynthesis, capturing light energy in plants but does not contribute to protein synthesis. Thus, mRNA stands out as the correct answer in this context.