# Histopathology Board Practice Exam (Sample)

## Study Guide


**Everything you need from our exam experts!**

# Questions

**1. Which tools are used for physical testing of decalcification during tissue processing?**

**A. Bend, pin, scalpel**

**B. Forceps, scissors, needle**

**C. Sliders, cutters, rulers**

**D. Turns, stamps, chisels**

**2. What action should be taken if the decalcification endpoint test results in a clear solution?**

**A. Add ammonium oxalate**

**B. Increase temperature**

**C. Add hydrochloric acid**

**D. Filter the solution**

**3. What is a commonly used cleaning agent in tissue processing?**

**A. 1% sodium hypochlorite**

**B. 70% ethanol**

**C. Formol-saline**

**D. Absolute alcohol**

**4. What is the recommended duration for dehydrating tissues in running water?**

**A. 1-12 hours**

**B. 1-3 hours**

**C. 1-7 days**

**D. 1 hour**

**5. Which alcohol is used to dissolve paraffin wax?**

**A. Amyl alcohol**

**B. Ethyl alcohol**

**C. Methyl alcohol**

**D. Isopropyl alcohol**

**6. Which concentration of alcohol should be used for dehydration after running water?**

**A. 30%**

**B. 50%**

**C. 70%**

**D. All of the above**

**7. What is the boiling point of dioxane (diethylene oxide)?**

**A. 56C**

**B. 82.3C**

**C. 101.5C**

**D. 117.7C**

**8. If the precipitation of insoluble hydroxide or calcium oxalate is cloudy, what does this indicate?**

**A. Presence of magnesium**

**B. Presence of calcium**

**C. Presence of sodium**

**D. Presence of potassium**

**9. What property does trichloroacetic acid exhibit in tissue processing?**

**A. Staining**

**B. Fixation**

**C. Dehydration**

**D. Embedding**

**10. Which stage is usually performed after embedding in tissue processing?**

**A. Section-Cutting**

**B. Fixation**

**C. Mounting**

**D. Dehydration**

# Answers

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

# Explanations

## 1. Which tools are used for physical testing of decalcification during tissue processing?

**A. Bend, pin, scalpel**

**B. Forceps, scissors, needle**

**C. Sliders, cutters, rulers**

**D. Turns, stamps, chisels**

**The tools utilized for physical testing of decalcification during tissue processing are specifically designed to assess the calcium content and the integrity of the tissue samples. When decalcifying tissue, it is essential to determine if the bone or calcified tissue has been adequately treated to facilitate sectioning and visualization under the microscope. Bending instruments can physically test the pliability of decalcified tissue, pinching can help assess the integrity, and a scalpel is used to take thin slices of the decalcified specimen for further analysis. This hands-on approach provides immediate feedback regarding the effectiveness of the decalcification process. If the tissue is still too hard, then the decalcification process may need to be continued. Other tools listed in the alternatives serve different purposes in histopathology. For example, forceps and scissors (from another option) are standard tools for handling and cutting tissue but are not specifically indicative of decalcification status. Similarly, sliders, rulers, turns, and chisels, while relevant to various techniques in histopathology, do not directly apply to the assessment of decalcification in the same manner as the correct choice.**

## 2. What action should be taken if the decalcification endpoint test results in a clear solution?

**A. Add ammonium oxalate**

**B. Increase temperature**

**C. Add hydrochloric acid**

**D. Filter the solution**

**When performing a decalcification procedure on bone or mineralized tissue, the goal is to remove calcium without adversely affecting the overall integrity of the tissue. If the endpoint test indicates a clear solution, this suggests that the decalcification process has been effective, and all the calcium has been removed from the sample. Adding ammonium oxalate at this point serves to precipitate any remaining calcium ions that may not be fully visible in the clear solution. It acts as a confirming agent, helping to ensure that the decalcification process is complete. When ammonium oxalate is introduced, it will react with any calcium ions present, forming calcium oxalate, which can then be filtered out. This step is crucial to prevent any residual mineralization that could interfere with subsequent histological analysis. The other options do not address the need for confirmation of complete decalcification or filtering out any potential calcium precipitates. Increasing the temperature may speed up the decalcification process but is not a suitable test for confirming the endpoint, and adding hydrochloric acid might lead to over-decalcification, potentially damaging the tissue structure. Filtering the solution alone does not necessarily confirm the absence of calcium ions since the clarity of the solution might not reflect the complete absence of**

## 3. What is a commonly used cleaning agent in tissue processing?

**A. 1% sodium hypochlorite**

**B. 70% ethanol**

**C. Formol-saline**

**D. Absolute alcohol**

**The commonly used cleaning agent in tissue processing is 70% ethanol. Ethanol is widely utilized in the histopathology laboratory for several reasons. It serves as a dehydrating agent during the tissue processing procedure, allowing the replacement of water in the tissue with ethanol. The 70% concentration is particularly effective as it strikes a balance between adequate dehydration and maintaining tissue morphology, preventing excessive shrinkage that could occur with higher concentrations. Sodium hypochlorite is often used as a disinfectant rather than as a cleaning agent in tissue processing. While it can effectively kill bacteria and decontaminate surfaces, it is not typically used during the preparation of tissue samples for histopathological examination. Formol-saline, which consists of formaldehyde in saline, is primarily a fixative and is used to preserve tissue morphology rather than clean it. This makes it unsuitable as a cleaning agent in the tissue processing workflow. Absolute alcohol serves as a dehydrating agent as well but is generally used later in the processing steps after tissues have been fixed and prepared. Using absolute alcohol can sometimes lead to over-dehydration, which can compromise tissue integrity. Thus, 70% ethanol stands out as the most appropriate and commonly used agent for cleaning tissues during processing**

## 4. What is the recommended duration for dehydrating tissues in running water?

**A. 1-12 hours**

**B. 1-3 hours**

**C. 1-7 days**

**D. 1 hour**

**The recommended duration for dehydrating tissues in running water is typically between 1 to 12 hours. This duration is important to ensure thorough penetration and removal of any excess water from the tissue specimens. The process allows for the tissues' cellular structures to be adequately prepared for subsequent processing steps, such as embedding in paraffin. Dehydration is a critical step in histological preparation because it ensures that the final sections can be cut more effectively, leading to clearer histological analysis. If tissues are not adequately dehydrated, it can lead to artifacts and poorer quality sections, complicating microscopic interpretations. Shorter durations, such as 1-3 hours, may not be sufficient for larger or more complex tissue samples, while excessive durations (like several days) might lead to over-dehydration and potential tissue damage. Therefore, the range of 1 to 12 hours represents a balance that facilitates effective tissue preparation while minimizing the risk of compromising the tissue integrity.**

## 5. Which alcohol is used to dissolve paraffin wax?

**A. Amyl alcohol**

**B. Ethyl alcohol**

**C. Methyl alcohol**

**D. Isopropyl alcohol**

**Amyl alcohol, also known as pentanol, is effective for dissolving paraffin wax due to its appropriate solvent properties. Paraffin wax is typically used in histology for embedding tissue samples, and adequate removal of the wax is critical for proper staining and analysis. Amyl alcohol's molecular structure allows it to interact effectively with the wax, breaking it down and facilitating the removal process in tissue preparation. In contrast, the other alcohols listed may not possess the same efficacy or appropriateness for this specific task. Ethyl alcohol is often used for dehydration and fixation but does not dissolve paraffin as effectively as amyl alcohol. Methyl alcohol (methanol) is similarly more suited for fixation rather than dissolving wax, and isopropyl alcohol, while a useful dehydrating agent, also lacks the specific solvent characteristics needed to dissolve paraffin wax effectively. Thus, amyl alcohol is the most suitable choice for this histological application.**

## 6. Which concentration of alcohol should be used for dehydration after running water?

**A. 30%**

**B. 50%**

**C. 70%**

**D. All of the above**

**For tissue processing in histopathology, dehydration is a crucial step that typically follows fixation. The process involves removing water from the tissue to allow for better infiltration with embedding media, such as paraffin. When it comes to the concentration of alcohol used for dehydration, different concentrations serve different purposes. While 70% ethanol is widely recognized as the standard concentration for dehydrating biological tissues, other concentrations might also be used in specific scenarios for the same purpose. 30% alcohol can begin to dehydrate tissues, but it may not be as effective as higher concentrations since the dehydration process is gradual. Similarly, 50% alcohol is used less frequently but can still assist in the dehydration process, though it is also weaker compared to higher concentrations. In practical applications, using all these concentrations can still effectively remove water from tissues in stages. Therefore, the option suggesting that any of these concentrations can be utilized accurately reflects the flexibility in histological practices. Each concentration has its utility in different contexts depending on the specific needs of the tissue being processed and the desired outcomes.**

## 7. What is the boiling point of dioxane (diethylene oxide)?

**A. 56C**

**B. 82.3C**

**C. 101.5C**

**D. 117.7C**

**The boiling point of dioxane, also known as diethylene oxide, is accurately reported as 101.5°C. This information is supported by scientific literature reflecting the physical properties of the compound. Dioxane is a cyclic ether with a relatively low boiling point as compared to many high molecular weight compounds, which can be attributed to its molecular structure and the presence of polar ether linkages that allow for some intermolecular interactions. The significant property of dioxane being a solvent in various chemical applications is also reflective of its boiling point, as this makes it both easy to work with and effective in applications involving heat. Understanding the boiling point is key in both laboratory settings and industrial applications, where temperature control is crucial for processes involving dioxane.**

## 8. If the precipitation of insoluble hydroxide or calcium oxalate is cloudy, what does this indicate?

**A. Presence of magnesium**

**B. Presence of calcium**

**C. Presence of sodium**

**D. Presence of potassium**

**The precipitation of insoluble hydroxide or calcium oxalate appearing cloudy is indicative of the presence of calcium. In the context of a histopathological examination, the formation of such precipitates often occurs when calcium interacts with oxalate or hydroxide ions, leading to the creation of insoluble substances that can cloud a solution. Calcium oxalate is prominently associated with calcium in biological systems and is often seen in certain types of pathological calcifications, such as in kidney stones or in tissues undergoing degenerative changes. The cloudiness is essentially due to the formation and aggregation of these precipitates, which highlights the presence of calcium ions in the solution. In contrast, the other ions listed do not form similarly significant or noticeable precipitates under the same conditions. Magnesium can form precipitates, but they are not typically characterized by cloudiness in the presence of hydroxide or oxalate under normal physiological or pathological conditions. Sodium and potassium do not generally precipitate in similar manners with these anions, thus would not lead to a cloudy appearance in this context. This specificity regarding calcium makes it the clear answer when discussing the precipitation of these compounds.**

## 9. What property does trichloroacetic acid exhibit in tissue processing?

**A. Staining**

**B. Fixation**

**C. Dehydration**

**D. Embedding**

**Trichloroacetic acid is primarily recognized for its role in fixation during tissue processing. Fixation is a crucial step that preserves tissue structure and composition by stabilizing proteins and preventing autolysis and putrefaction. Trichloroacetic acid achieves this by precipitating proteins and denaturing enzymes, which helps to retain the morphological characteristics of the specimen. This acid is particularly useful in preparing tissues for subsequent processing steps such as embedding and sectioning. By fixing the tissue, trichloroacetic acid ensures that cellular components remain intact, allowing for accurate microscopic examination and staining in later stages. Its effective fixation properties make it a valuable reagent in histological techniques, and its ability to preserve the fine structure of tissues is essential for accurate diagnosis.**

## 10. Which stage is usually performed after embedding in tissue processing?

**A. Section-Cutting**

**B. Fixation**

**C. Mounting**

**D. Dehydration**

**The stage that occurs after embedding in tissue processing is section-cutting. This step involves using a microtome to create thin slices of the embedded tissue blocks, allowing for microscopic examination. The thickness of the sections is crucial because it determines how well the tissue can be visualized under the microscope and influences diagnostic accuracy. Proper section-cutting enables the pathologist to assess cellular morphology, the architecture of the tissue, and the presence of any abnormalities or diseases. The other stages mentioned occur prior to embedding. Fixation, for example, is the initial step that preserves tissue structure and composition. Dehydration follows fixation and prepares the tissue for embedding by removing water. Mounting, while essential for preparing the slides for viewing, occurs after section-cutting when the thin tissue sections are placed onto slides for further staining and examination. Thus, section-cutting is the definitive stage immediately subsequent to embedding in the tissue processing sequence.**