Capillary Action Quiz Questions and Answers PDF

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Which properties of a liquid influence its capillary action? (Select all that apply)

- [ ] Density
- [ ] **Surface tension ✓**
- [ ] **Viscosity ✓**
- [ ] Boiling point

> The capillary action of a liquid is influenced by its cohesive and adhesive properties, as well as its surface tension. These factors determine how well a liquid can rise or fall in narrow spaces, such as in a capillary tube.

What are the characteristics of liquids that exhibit strong capillary action? (Select all that apply)

- [ ] **High surface tension ✓**
- [ ] **Low viscosity ✓**
- [ ] High density
- [ ] **Strong adhesive forces ✓**

> Liquids that exhibit strong capillary action typically have high surface tension, strong adhesive forces with the surrounding material, and low viscosity. These characteristics allow them to rise or fall in narrow spaces against gravity.

Which force is primarily responsible for capillary action?

- ◯ Gravitational force
- ◯ Magnetic force
- ◯ **Cohesiveness force ✓**
- ◯ Nuclear force

> Capillary action is primarily caused by the combination of adhesive forces between the liquid and the surface of the material, and cohesive forces within the liquid itself. These forces allow liquids to rise or fall in narrow spaces without the assistance of external forces.

Which factors affect the extent of capillary action? (Select all that apply)

- [x] **Tube diameter ✓**
- [x] **Liquid viscosity ✓**
- [x] **Surface material ✓**
- [ ] Temperature

> Capillary action is influenced by factors such as the surface tension of the liquid, the adhesive forces between the liquid and the solid surface, and the diameter of the capillary tube or pore. Additionally, the properties of the liquid, such as viscosity, also play a role in determining the extent of capillary action.

Which of the following forces are involved in capillary action? (Select all that apply)

- [x] **Cohesion ✓**
- [x] **Adhesión ✓**
- [x] **Surface tension ✓**
- [ ] Friction

> Capillary action is primarily driven by cohesive and adhesive forces. Cohesiveness refers to the attraction between molecules of the same substance, while adhesiveness refers to the attraction between different substances, such as water and the walls of a capillary tube.

Which of the following liquids is most likely to exhibit capillary action in a glass tube?

- ◯ Mercury
- ◯ Oil
- ◯ **Water ✓**
- ◯ Alcohol

> Capillary action is most pronounced in liquids that have strong adhesive forces with the walls of the container, such as water in a glass tube. Therefore, water is the liquid most likely to exhibit capillary action in this scenario.

What happens to the capillary rise when the diameter of the tube decreases?

- ◯ It decreases
- ◯ It remains the same
- ◯ **It increases ✓**
- ◯ It stops completely

> As the diameter of the tube decreases, the capillary rise increases. This is due to the greater influence of surface tension in narrower tubes, which enhances the ability of liquid to climb against gravity.

What is capillary action?

- ◯ **The ability of a liquid to flow in narrow spaces without external forces ✓**
- ◯ The process of evaporation in plants
- ◯ The movement of solids in liquids
- ◯ The diffusion of gases in the air

> Capillary action is the ability of a liquid to flow in narrow spaces without the assistance of external forces, primarily due to the combination of cohesive and adhesive forces. This phenomenon is commonly observed in plants, where water moves from the roots to the leaves through tiny tubes called xylem.

Explain how capillary action is essential for the survival of plants.

> **Capillary action helps transport water and nutrients from the roots to the leaves, enabling photosynthesis and growth.**

Describe an experiment you could conduct to demonstrate capillary action using household materials.

> **Place a paper towel with one end in a glass of colored water and observe the water rising through the towel due to capillary action.**

How does surface tension contribute to capillary action? Provide a detailed explanation.

> **Surface tension allows the liquid to form a meniscus and rise in narrow tubes by minimizing the surface area, which is crucial for capillary action.**

Discuss the role of adhesion in capillary action and give an example of where this can be observed.

> **Adhesión causes liquid molecules to stick to the walls of a tube, pulling the liquid upward. This can be observed in water climbing up a glass tube.**

Why does mercury exhibit a downward meniscus in a glass tube, contrary to water?

> **Mercury has stronger cohesive forces than adhesive forces with glass, causing it to form a convex meniscus and not rise in the tube.**

How can understanding capillary action be beneficial in designing medical devices?

Understanding capillary action can help design devices like microfluidic chips that rely on precise liquid movement for diagnostics and analysis.

What is the primary application of capillary action in plants?

- ◯ Photosynthesis
- ◯ Nutrient absorption
- ◯ **Water transport from roots to leaves ✓**
- ◯ Seed dispersal

Capillary action in plants primarily facilitates the movement of water and nutrients from the roots to the leaves, enabling essential physiological processes such as photosynthesis and transpiration.

Which material is likely to show the least capillary action with water?

- ◯ Glass
- ◯ Plastic
- ◯ **Metal ✓**
- ◯ Paper

Materials with low surface energy and non-polar characteristics, such as wax or plastic, exhibit minimal capillary action with water due to their inability to form strong adhesive forces with the liquid.

In which of the following scenarios is capillary action observed? (Select all that apply)

- ☐ **Water rising in a paper towel ✓**
- ☐ Oil spreading on water
- ☐ **Ink flowing in a pen ✓**
- ☐ Water boiling

Capillary action is observed in scenarios where liquid rises in narrow spaces, such as water moving up a thin straw or through soil. This phenomenon occurs due to the adhesive forces between the liquid and the surrounding material, as well as the cohesive forces within the liquid itself.

Which law describes the height to which a liquid will rise in a capillary tube?

- ◯ Boyles's Law
- ◯ **Jurin's Law ✓**
- ◯ Newton's Law
- ◯ Archimedes' Principle

> The height to which a liquid will rise in a capillary tube is described by the capillary rise phenomenon, which is governed by the principles of surface tension and adhesion. This behavior is quantitatively explained by the Jurin's Law.

What is the contact angle in the context of capillary action?

- ◯ The angle between two liquid surfaces
- ◯ **The angle at which a liquid interface meets a solid surface ✓**
- ◯ The angle of refraction in a liquid
- ◯ The angle of incidence of light on a liquid

> The contact angle is the angle formed between the tangent to the liquid surface and the solid surface at the point of contact. It determines the wettability of a surface and influences the extent of capillary action.

Which of the following are examples of capillary action in daily life? (Select all that apply)

- ☐ **Blood moving through capillaries ✓**
- ☐ **Water climbing up a straw ✓**
- ☐ Milk curding
- ☐ **Water spreading on a tissue ✓**

> Capillary action is observed in various daily life scenarios, such as when a paper towel absorbs water or when plants draw water from the soil through their roots. These examples illustrate how liquid can move through narrow spaces against gravity due to adhesive and cohesive forces.