**Bell Ringer:** Enzyme Experimental Design

Catalase is an enzyme that protects cells from damage by helping convert the toxin hydrogen peroxide (H2O2) into water (H2O) and oxygen (O2). The table below shows the data the student collected during their investigation.

**Experimental Data**

| **Test Tube** | **Amount of Catalase (drops)** | **Amount of H2O2 (mL)** | **pH of solution** | **Temperature of Solution (oC)** | **Relative Rate of Reaction** |
| --- | --- | --- | --- | --- | --- |
| 1 | 10 | 3 | 1 | 5 | No Reaction |
| 2 | 10 | 3 | 1 | 30 | No Reaction |
| 3 | 10 | 3 | 1 | 60 | No Reaction |
| 4 | 10 | 3 | 3 | 5 | Very Slow Reaction |
| 5 | 10 | 3 | 3 | 30 | Slow Reaction |
| 6 | 10 | 3 | 3 | 60 | No Reaction |
| 7 | 10 | 3 | 7 | 5 | Slow Reaction |
| 8 | 10 | 3 | 7 | 30 | Rapid Reaction |
| 9 | 10 | 3 | 7 | 60 | No Reaction |

In your BILL, answer the following questions:

1. What was the student investigating in this experiment?
2. **Identify** the test tube that **most likely** has physical conditions similar to the conditions in human cells. **Explain** your answer.
3. **Describe** how catalase activity changes as pH decreases. **Justify** your answer using data from the table.
4. **Explain** how catalase activity changes as temperature increases. **Justify** your explanation using data from the table to support your answer.
5. **Explain** why temperature affects catalase activity in the way you described in part (d).

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