Biology Phase 1 QEP

Amylase is an enzyme produced in the saliva of animals to breakdown complex sugars like starch. In the example data table below each experimental group consisted of 10 test tubes filled with equal amounts and concentrations of starch solution mixed with amylase solution. These mixtures were allowed to mix in water bathes held at their designated temperatures for 5 minutes. Afterwards, Iodine solution was added to each test tube and timed using a stop watch to determine the number of seconds it would take to cause the breakdown of starch to glucose. Iodine is used as a starch indicator, which will cause the sample to turn black/purple if starch is present and yellow/orange if it is reduced to a simple sugar.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time for Starch to Disappear (s) | Experimental Group 1 0 Degrees Celsius | Experimental Group 2  20 Degrees Celsius | Experimental Group 3  40 Degrees Celsius | Experimental Group 4  60 Degrees Celsius |
| Test Tube 1 | 120 | 58 | 100 | 450 |
| Test Tube 2 | 119 | 60 | 92 | 400 |
| Test Tube 3 | 117 | 62 | 115 | 425 |
| Test Tube 4 | 120 | 55 | 97 | 415 |
| Test Tube 5 | 118 | 58 | 101 | 120 |
| Test Tube 6 | 125 | 51 | 97 | 445 |
| Test Tube 7 | 122 | 56 | 96 | 435 |
| Test Tube 8 | 120 | 57 | 91 | 425 |
| Test Tube 9 | 121 | 59 | 102 | 415 |
| Test Tube 10 | 119 | 54 | 100 | 400 |

Questions:

1. What temperature produced the most optimal rate of reaction between amylase and starch?
2. What is the average time, in seconds, for the amylase to reduce the starch in the most optimal temperature group?