

## Questions taken from an old NYS Regents Examination

Base your answers to questions 1 through 6 on the information below and on your knowledge of biology.

An investigation was carried out to measure the rate of activity of catalase, an enzyme that breaks down hydrogen peroxide. Five 40-mL solutions of the enzyme at concentrations of 20%, 40%, 60%, 80%, and 100% were prepared. A filter paper disk was placed in each enzyme solution. Each soaked disk from the different enzyme concentrations was then added to different cups containing 30 mL of 1% hydrogen peroxide. The rate of catalase activity was inferred from measurements of how fast the disks rose from the bottom to the top of each cup.

The following data were obtained:

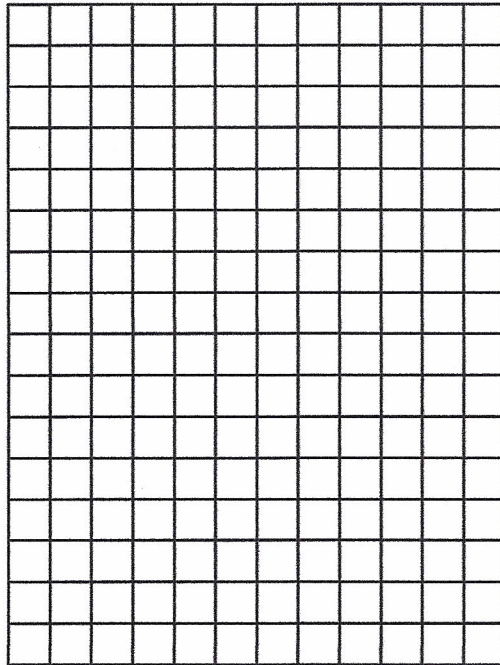
40%—12.1 seconds, 80%—5.8 seconds, 100%—4.1 seconds, 20%—15.8 seconds, and 60%—9.9 seconds.

*Directions* (1–2): Organize the data by completing the data table, according to the directions below.

1. Label the second column of the data table with an appropriate heading and record that label on the y-axis of the graph. [Be sure to include units.] [1]
2. Complete the data table so that the percent enzyme *increases* from the top to the bottom of the table. [1]

Enzyme Concentration (percent)	

Population



Day

● Species A

△ Species B

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Use Only

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4. Based on the daily counts, on which day did it first become evident that one species was better adapted than the other species for survival in the environment provided? [1]

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5. The difference in the population sizes on the fifth day most likely resulted from

- (1) temperature changes
- (2) variations in light intensity
- (3) competition between species
- (4) the buildup of nitrogen gas

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## Questions taken from an old NYS Regents Examination.

Base your answers to questions 1 through 5 on the information and data table below and on your knowledge of biology.

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A biology student performed an experiment to determine which of two species of single-celled organisms would survive best when cultured together in a certain environment. The student placed 10 organisms of each species into a large test tube. Throughout the experiment, the test tube was maintained at 30°C. After the test tube was set up, the population of each species was determined each day for 5 days. The data collected are shown in the table below.

**Data Table**


Day	Population	
	Species A	Species B
1	10	10
2	16	16
3	32	32
4	48	12
5	60	4

*Directions (1–5):* Using the information in the data table, construct a line graph on the grid on the next page, following the directions below.

1. Mark an appropriate scale on each labeled axis. [1]
2. Plot the data for species A on the grid. Surround each point with a small circle and connect the points. [1]

Example: 

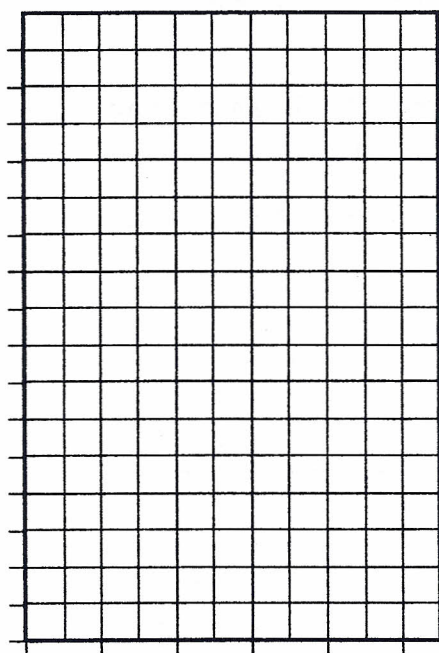
3. Plot the data for species B on the grid. Surround each point with a small triangle and connect the points. [1]

Example: 

*Directions* (3–4): Using the information in the data table, construct a line graph on the grid provided, following the directions below.

3. Mark an appropriate scale on each axis. [1]
4. Plot the data from your data table. Surround each point with a small circle and connect the points. [1]

Example: 



5. State *one* valid conclusion that relates enzyme concentration to reaction rate. [1]
6. State two factors which would cause a decrease in the activity of catalase. [1]



Base your answers to questions 1 through 6 on the information below and on your knowledge of biology.

An investigation was carried out to measure the rate of activity of catalase, an enzyme that breaks down hydrogen peroxide. Five 40-mL solutions of the enzyme at concentrations of 20%, 40%, 60%, 80%, and 100% were prepared. A filter paper disk was placed in each enzyme solution. Each soaked disk from the different enzyme concentrations was then added to different cups containing 30 mL of 1% hydrogen peroxide. The rate of catalase activity was inferred from measurements of how fast the disks rose from the bottom to the top of each cup.

The following data were obtained:

40%—12.1 seconds, 80%—5.8 seconds, 100%—4.1 seconds, 20%—15.8 seconds, and 60%—9.9 seconds.

*Directions* (1–2): Organize the data by completing the data table, according to the directions below.

1. Label the second column of the data table with an appropriate heading and record that label on the *y*-axis of the graph. [Be sure to include units.] [1]
2. Complete the data table so that the percent enzyme *increases* from the top to the bottom of the table. [1]

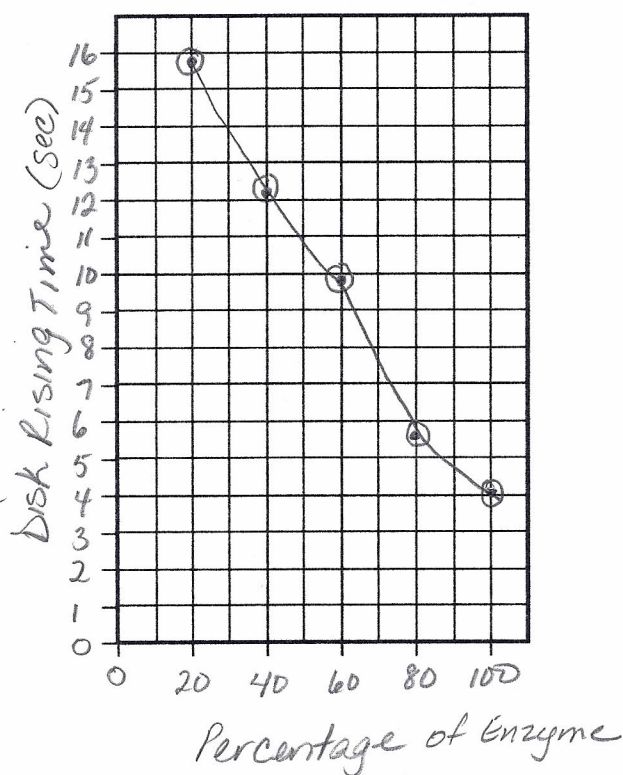
Enzyme Concentration (percent)	Disk Rising Time (seconds)
20	15.8
40	12.1
60	9.9
80	5.8
100	4.1

## Answer Key

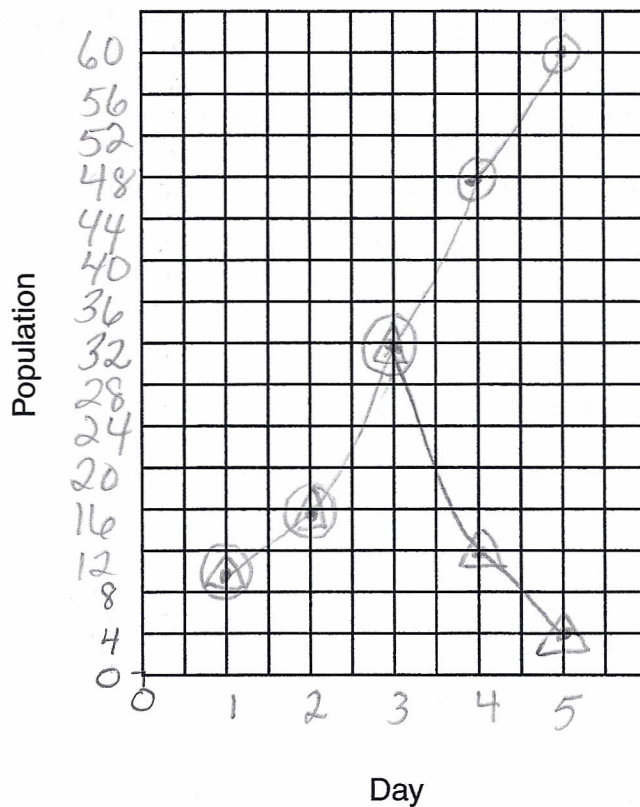
*Directions (3-4):* Using the information in the data table, construct a line graph on the grid provided, following the directions below.

3. Mark an appropriate scale on each axis. [1]
4. Plot the data from your data table. Surround each point with a small circle and connect the points. [1]

Example:



5. State one valid conclusion that relates enzyme concentration to reaction rate. [1]
  - As the concn. of enzyme increases, the rate of reaction increases.
  - More enzyme causes a faster reaction.
  - As the concn. of enzyme decreases, the reaction rate decreases.
6. State two factors which would cause a decrease in the activity of catalase. [1]
  - A decrease amount in enzymes.
  - High temperature
  - Too low or Too high pH level.



● Species A  
 ▲ Species B

For Teacher  
 Use Only

4. Based on the daily counts, on which day did it first become evident that one species was better adapted than the other species for survival in the environment provided? [1]

Day 4

5. The difference in the population sizes on the fifth day most likely resulted from

- (1) temperature changes
- (2) variations in light intensity
- (3) competition between species
- (4) the buildup of nitrogen gas

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