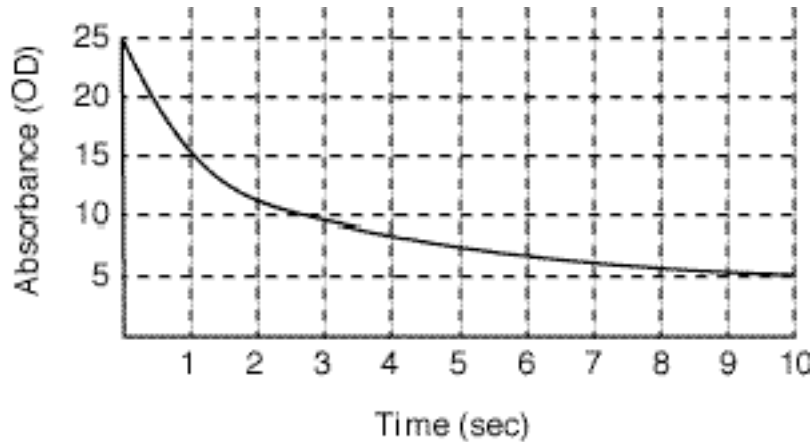


Human Physiology Lab – IPHY 3435
Sample Questions for Exam 3, Spring 2007



1. The graph above shows the results for an MDH assay in the enzyme lab. In the lab you went through a simple procedure to measure the enzyme activity from graphs like this one. Going through the same procedure without using the computer, you can see clearly from this graph that the enzyme activity is represented by which number?

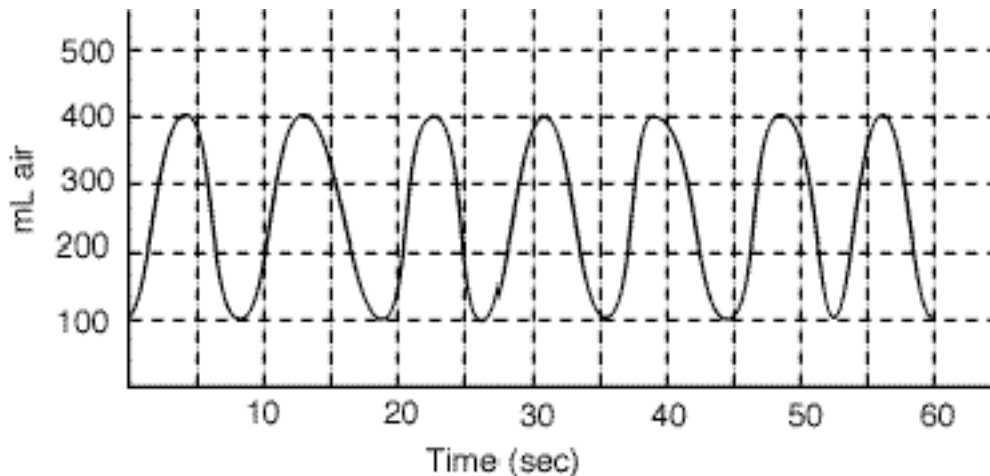
- A) 5 OD
- B) 25 OD
- C) 10 OD/sec
- D) 5 OD/sec
- E) 2.5 OD/sec

2. MDH is an enzyme that

- A) Is more abundant in fast-twitch than slow-twitch muscle fibers
- B) Converts pyruvate to lactate
- C) Converts lactate to pyruvate
- D) Is necessary for the Krebs Cycle to operate
- E) None of the above

3. *Hering-Breuer* refers to

- A) The relationship between end-diastolic volume and stroke volume
- B) A mechanism that prevents over-inflation of the lungs
- C) The effect of varying temperature on the rate of a reaction
- D) The effect of varying substrate concentration on the rate of a reaction
- E) A mechanism that slows heart rate during hypoxia



4. The graph above shows the result from a spirometry test. The subject has a weight of 183 lbs. (83 kg), a height of 73 inches (185 cm) and an age of 33 years. What is the value of AV (alveolar ventilation)?

- A) 308 mL air/min
- B) 805 mL air/min
- C) 819 mL air/min
- D) 1519 mL air/min
- E) 1589 mL air/min
- F) 1869 mL air/min

5. In the enzyme lab, suppose you left a dark fingerprint on the cuvette used to assay for total protein in the liver supernatant. Which of the following error(s) is/are most likely to result?

- A. The standardized LDH activity in liver tissue will be overestimated
- B. The standardized MDH activity in liver tissue will be overestimated
- C. The standardized LDH activity in liver tissue will be underestimated
- D. The standardized MDH activity in liver tissue will be underestimated
- E. The MDH/LDH ratio in liver tissue will be overestimated
- F. The MDH/LDH ratio in liver tissue will be underestimated
- G. Both A and B
- H. Both C and D
- I. A, B and E are correct
- J. C, D, and F are correct

6. In the enzyme lab, a linear regression of optical density as a function of protein concentration (mg/ml) yielded the following regression equation:

$$y = 0.04x + 0.03$$

You determine that the optical density of a sample of vastus tissue is equal to 2. What is the protein concentration of this sample?

7. A subject inhales as much air as possible, and then exhales the breath as completely as possible. The amount of air in this exhaled breath is the:

- A. Inspiratory capacity

- B. Expiratory reserve volume
- C. Total lung capacity
- D. Functional capacity
- E. Vital capacity

8. Activity of the intercostals muscles is controlled by the:

- A. Intercostal nerves
- B. Phrenic nerves
- C. Vagus nerves
- D. Sympathetic trunk
- E. Sacral nerves

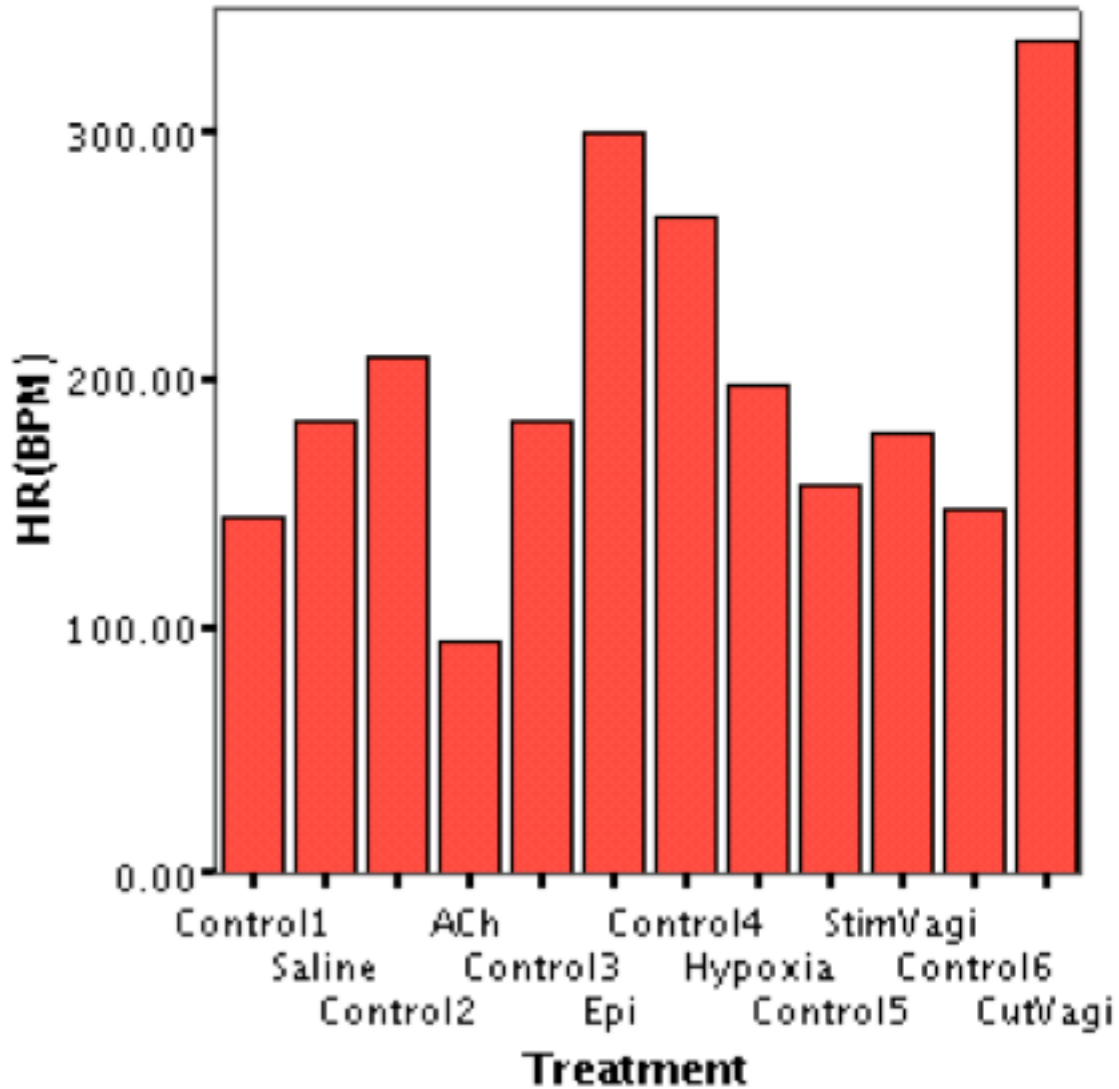
9. Suppose you breathed into a plastic bag for one minute. Which of the following would be most likely to occur?

- A. Your arterial pO₂ increases
- B. Your arterial pCO₂ decreases
- C. Your arterial pH increases
- D. Your arterial [H⁺] increases

10. Stimulation from the sympathetic nervous system speeds up conduction velocity through the bundle of His by what mechanism?

- A. Increased influx of Ca⁺⁺
- B. Increased efflux of Ca⁺⁺
- C. Increased influx of K⁺
- D. Increased efflux of K⁺
- E. None of the above

11. Suppose you obtained the following heart rate data in the rat heart lab:



Which one of the following statements can be reasonably deduced from this graph?

- A. Administering acetylcholine did not have the predicted effect.
- B. Cutting the vagus resulted in cardiac arrhythmia.
- C. Hypoxia caused an increase in the heart rate.
- D. The controls were not properly performed so they should be discarded.
- E. Attempted stimulation of the vagus nerve was unsuccessful.

ANSWERS

- 1. C
- 2. D
- 3. B
- 4. C
- 5. H
- 6. $x = (2 - 0.03) / 0.04 = 49.25 \text{ mg/mL}$.
- 7. E
- 8. A

9. D
10. A
11. E