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Exercise 29

Analyzing the physics of dance can add fundamentally to a dancer's skill. Although dancers seldom see themselves totally in physical terms -- as body mass moving through space under the influence of well-known forces and obeying physical laws -- neither can they afford to ignore the physics of movement. Some movements involving primarily vertical or horizontal motions of the body as a whole, in which rotations can be ignored, can be studied using simple equations of linear motion in three dimensions. However, rotational motions require more complex approaches that involve analyses of the way the body's mass is distributed, the axes of rotation involved in different types of movement, and the sources of the forces that produce the rotational movement. (120 words)

- 1. The primary purpose of the passage is to
 - (A) initiate a debate over two approaches to analyzing a field of study
 - (B) describe how one field of knowledge can be applied to another field
 - (C) point out the contradictions between two distinct theories
 - (D) Define and elaborate on an accepted scientific principle
 - (E) discuss the application of a new theory within a new setting

For the following question, consider each of the choices separately and select all that apply

- 2. The author mentions all of the following as contributing to an understanding of the physics of dance
- A analyses of the way in which the body's mass is distributed
- B equations of linear motion in three dimensions
- analyses of the sources that produce rotational motions







3. Hastings' contracture is a disorder of the connective tissue in one or both hands, most commonly causing loss of mobility. A survey of thousands of medical-insurance claims found that over 30 percent of people who had one hand operated on for Hastings' contracture underwent surgery a second time for this disorder within three years. Clearly, therefore, a single surgical treatment of Hastings' contracture is often ineffective at providing long-term correction of the disorder.

- Which of the following, if true, most seriously weakens the argument?
 - (A) The medical-insurance claims did not specie whether the surgery was on the patient's right or left hand.
 - (B) The surgical techniques used to treat Hastings' contracture are identical to those used successfully to treat certain work-related injuries to the hand.
 - (C) A separate survey found that 90 percent of patients operated on for Hastings' contracture report increased hand mobility within one month after the surgery.
 - (D) All of the patients in the survey were required by their insurance companies to seek a second opinion from a qualified surgeon before undergoing the operation.
 - (E) Many people who have Hastings' contracture choose to tolerate its effects rather than undergo the risks of surgery.







The Fourteenth Amendment to the United States Constitution, ratified in 1868, prohibits state governments from denying citizens the "equal protection of the laws." Although precisely what the framers of the amendment meant by this equal protection clause remains unclear, all interpreters agree that the framers' immediate objective was to provide a constitutional warrant for the Civil Rights Act of 1866, which guaranteed the citizenship of all persons born in the United States and subject to United States jurisdiction. This declaration, which was echoed in the text of the Fourteenth Amendment, was designed primarily to counter the Supreme Court's ruling in Dred Scott v. Sandford that Black people in the United States could be denied citizenship. The act was vetoed by President Andrew Johnson, who argued that the Thirteenth Amendment, which abolished slavery, did not provide Congress with the authority to extend citizenship and equal protection to the freed slaves. Although Congress promptly overrode Johnson's veto, supporters of the act sought to ensure its constitutional foundations with the passage of the Fourteenth Amendment.

- 4. The author implies that the Fourteenth Amendment might not have been enacted if
 - (A) Congress' authority with regard to legislating civil rights had not been challenged
 - (B) the framers had anticipated the Supreme Court's ruling in Brown v. Board of Education
 - (C) the framers had believed that it would be used in deciding cases of discrimination involving non-racial groups
 - (D) most state governments had been willing to protect citizens' civil rights
 - (E) its essential elements had not been implicit in the Thirteenth Amendment
- 5.According to the passage, which of the following most accurately indicates the sequence of the events listed below?
 - I. Civil Rights Act of 1866
 - II. Dred Scott v. Sandford
 - III. Fourteenth Amendment
 - IV. Veto by President Johnson



- (B) I, IV, II, III
- (C) I, IV, III, II
- (D) II, I, IV, III
- (E) III, II, I, IV



- (A) trampled
- ® extended
- © annulled
- neutralized
- ® compromised



(172 words)





Many organisms are capable of altering their habitat significantly, sometimes limiting their own growth. The influence of the biological component of an ecosystem is often greater in fresh waters that in marine or terrestrial systems, because of the small size of many freshwater bodies. Many of the important effects of organisms are related to their physiology, especially growth and respiration. By their growth many species can deplete essential nutrients within the system, thus limiting their own growth or that of other species. Lund has demonstrated that in Lake Windermere the alga Asterionella is unable to grow in conditions that it itself has created. Once a year, in the spring, this plant starts to grow rapidly in the lake, using up so much silica from the water that by late spring there is no longer enough to maintain its own growth. The population decreases dramatically as a result. (147 words)

- 7.It can be inferred from the passage that which of the followings is true about *Asterionella* plants in Lake Windermere?
 - (A) They are not present except in early spring.
 - (B) They contribute silica to the waters as they grow.
 - (C) They are food for other organisms.
 - (D) They form a silica-rich layer on the lake bottom.
 - (E) Their growth peaks in the spring.
- 8. Select the sentence in the passage that indicates certain causes of the alteration of organisms to their habitat.









Design courses should be an essential element in engineering curricula. Because perceptive processes are not assumed to entail "hard thinking," nonverbal thought is sometimes seen as a primitive stage in the development of cognitive processes and inferior to verbal or mathematical thought. But it is paradoxical that when the staff of the *Historic American Engineering Record* wished to have drawings made of machines and isometric views of industrial processes for its historical record of American engineering, the only college students with the requisite abilities were not engineering students, but rather students attending architectural schools.

If courses in design, which in a strongly analytical engineering curriculum provide the background required for practical problem-solving, are not provided, we can expect to encounter silly but costly errors occurring in advanced engineering systems. For example, early models of high-speed railroad cars loaded with sophisticated controls were unable to operate in a snowstorm because a fan sucked snow into the electrical system. (157 words)



- 9. The author calls the predicament faced by the Historic American Engineering Record "paradoxical" most probably because
 - (A) the publication needed drawings that its own staff could not make
 - (B) architectural schools offered but did not require engineering design courses for their students
 - (C) college students were qualified to make the drawings while practicing engineers were not
 - (D) the drawings needed were so complicated that even students in architectural schools had difficulty making them.
 - (E) engineering students were not trained to make the type of drawings needed to record the development of their own discipline
- 10. The author uses the example of the early models of high-speed railroad cars primarily to
 - (A) weaken the argument that modern engineering systems have major defects because of an absence of design courses in engineering curricula
 - (B) support the thesis that the number of errors in modern engineering systems is likely to increase
 - (C) illustrate the idea that courses in design are the most effective means for reducing the cost of designing engineering systems
 - (D) support the contention that a lack of attention to the nonscientific aspects of design results in poor conceptualization by engineers
 - (E) weaken the proposition that mathematics is a necessary part of the study of design





