Nursing School

HESI-A2
Health Education Systems, Inc. Admission Assessment

Questions & Answers PDF

Latest Version: 6.0

Question: 1

Which of the following is an example of heat transfer through convection?

A. A microwave cooking food
B. A pancake cooking on an electric burner
C. A planet heated by the sun
D. A coastline heated by a warm ocean current

Answer: D

Explanation:
Convection is a process through which heat is transferred within a fluid by the movement of molecules, including large-scale internal flow of the fluid itself. Of the given choices, only the coastline heated by the warm ocean current fits this description. Food is cooked in a microwave through radiation, a pancake cooks primarily through conduction of heat from the burner to the pan to the pancake, and the sun heats planets through radiation of heat and energy' through the intervening space. The correct answer is D.

Question: 2

A boy whirls a ball on a string, spinning it in a circle 1.5 meters in diameter. The ball completes two revolutions every second. If the mass of the ball is 80 grams, what is the tension in the string?

A. 0.59 N
B. 1.2 N
C. 9.5 N
D. 19N

Answer: C

Explanation:

The tension in the string is equal to the centripetal force keeping the ball in circular motion, given by $F = \frac{mv^2}{r}$. Since the circumference of the circle of motion is $2\pi r = 2\pi(0.75\text{ m}) = 4.71\text{ m}$, and the period of the motion is $\frac{1\text{ s}}{2\text{ period}} = 0.5\text{ s per period}$, the velocity is given by $\frac{4.71\text{ m}}{0.5\text{ s}} = 9.42\text{ m/s}$. The centripetal force, the tension in the string, is therefore:

$$F = \frac{(0.080\text{ kg})(9.42\text{ m/s})^2}{0.75\text{ m}} = 9.5\text{ N}$$

Question: 3

A 100 -gram weight hangs motionless from a massless spring. If the weight is pulled down 40 centimeters from this equilibrium position, stretching the spring, what other information is needed to calculate the amount of work done on the spring?

A. The length of the spring when no mass is hung from it
B. The elastic potential energy of the stretched spring
C. The time it took to pull the weight down
D. None, there is already enough information to conclude no work was done on the spring

Answer: B

Explanation:
Stretching the spring gives it some elastic potential energy. The work done is equal to the total change in energy, so this (non-zero) potential energy' must be taken into account to calculate the (non-zero) work, and D is incorrect. Knowing the mass of the weight and the displacement from equilibrium is enough to find the spring constant and therefore this energy', but that information is not given! What is given is the mass of the weight, and the displacement from the equilibrium position of the hanging mass; no information is given about how much the spring stretches when the mass is first hung. The information in choice A compounds the problem; it does not provide information about the "weighted" equilibrium position, and the time provided by choice C is irrelevant. Without knowing the additional potential energy in the stretched spring (or without knowing the spring constant, from which we could calculate the potential energy'), it cannot be determined how much work was done on the spring. B is therefore correct.

Question: 4

A boy swings on a rope over a lake. When he steps off of the ledge to start his swing, he is 2.0 meters above the lake surface. At the bottom of the swing, just as he lets go of the rope, he is 0.5 meters above the surface. What is the boy's horizontal speed at the bottom of the swing?

a. 5.4 m/s
b. 6.3 m/s
c. 7.7 m/s
d. 8.9 m/s

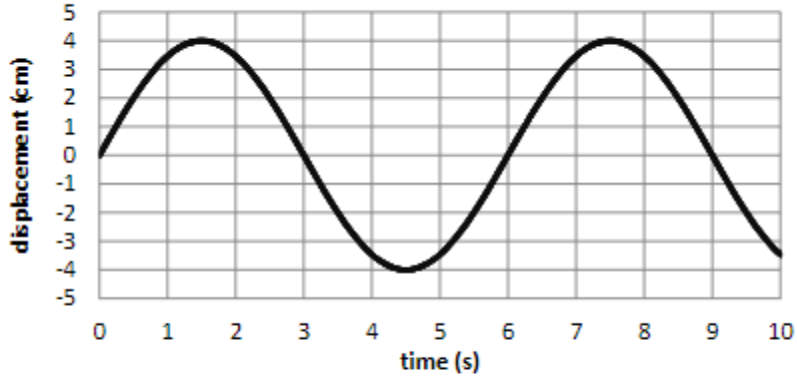
Answer: A

Explanation:

This problem can be solved using conservation of energy. At the top of the swing, just before he steps off the platform, the boy's kinetic energy is zero. His potential energy is equal to $mgh = m(9.8\ \text{m/s}^2)(2.0\ \text{m}) = (19.6\ \text{m}^2/\text{s}^2)m$. (The answer must be expressed this way, since the boy's mass is not given.) At the bottom of the swing, $mgh = m(9.8\ \text{m/s}^2)(0.5\ \text{m}) = (4.9\ \text{m}^2/\text{s}^2)m$. Since the total energy is conserved, the kinetic energy he gains must be equal to the potential energy he loses, and the kinetic energy at the bottom of his swing must then be $(19.6\ \text{m}^2/\text{s}^2)m - (4.9\ \text{m}^2/\text{s}^2)m = (14.7\ \text{m}^2/\text{s}^2)m$. The undetermined mass cancels, and we can solve for v to get $v = \sqrt{2(14.7\ \text{m}^2/\text{s}^2)} = 5.4\ \text{m/s}$.

Question: 5

The graph below displays the displacement from equilibrium over time of a point on a vibrating string. What is the amplitude of the vibration?



a. 3 s
b. 4 cm
c. 6 s
d. 8 cm

Answer: B

Explanation:
The amplitude is equal to the difference between the maximum displacement (for example, the height of the peak of the graph) and equilibrium. Here, equilibrium is at 0 cm, and the peak reaches 4 cm, so the amplitude is equal to (4 cm — O cm) = 4 cm. The x-axis (time) is irrelevant for finding the amplitude, and B is correct.

Question: 6

What is the main idea of the passage?

A. The nineteenth and early twentieth centuries were a dark period for medicine.
B. You have probably never had diphtheria.
C. Traditional vaccines contain altered microbes.
D. Vaccines help the immune system function properly.

Answer: D

Explanation:
The main idea of this passage is that vaccines help the immune system function properly. Identifying main ideas is one of the key skills tested by the HESI exam. One of the common traps that many test-takers fall into is assuming that the first sentence of the passage will express the main idea. Although this will be true for some passages, often the author will use the first sentence to attract interest or to make an introductory, but not central, point. On this question, if you assume that the first sentence contains the main idea, you will mistakenly choose answer B. Finding the main idea of a passage requires patience and thoroughness; you cannot expect to know the main

idea until you have read the entire passage. In this case, a diligent reading will show you that answer choices A, B, and C express details from the passage, but only answer choice D is a comprehensive summary of the author's message.

Question: 7

Which statement is NOT a detail from the passage?

A. Vaccines contain microbe parts or altered microbes.
B. The immune system typically needs a week to learn how to fight a new disease.
C. The symptoms of disease do not emerge until the body has learned how to fight the microbe.
D. A hundred years ago, children were at the greatest risk of dying from now-treatable diseases.

Answer: C

Explanation:
This passage does not state that the symptoms of disease will not emerge until the body has learned to fight the disease. The reading comprehension section of the HESI exam will include several questions that require you to identify details from a passage. The typical structure of these questions is to ask you to identify the answer choice that contains a detail not included in the passage. This question structure makes your work a little more difficult, because it requires you to confirm that the other three details are in the passage. In this question, the details expressed in answer choices A, B, and D are all explicit in the passage. The passage never states, however, that the symptoms of disease do not emerge until the body has learned how to fight the disease-causing microbe. On the contrary, the passage implies that a person may become quite sick and even die before the body learns to effectively fight the disease.

Question: 8

What is the meaning of the word virulent as it is used in the third paragraph?

A. Tiny
B. Malicious
C. Contagious
D. Annoying

Answer: B

Explanation:
In the third paragraph, the word virulent means "malicious." The reading comprehension section of the HESI exam will include several questions that require you to define a word as it is used in the passage. Sometimes the word will be one of those used in the vocabulary section of the exam; other times, the word in question will be a slightly difficult word used regularly in academic and professional circles. In some cases, you may already know the basic definition of the word. Nevertheless, you should always go back and look at the way the word is used in the passage. The

HESI exam will often include answer choices that are legitimate definitions for the given word, but which do not express how the word is used in the passage. For instance, the word virulent could in some circumstances mean contagious or annoying. However, since the passage is not talking about transfer of the disease and is referring to a serious illness, malicious is the more appropriate answer.

Question: 9

What is the author's primary purpose in writing the essay?

A. To entertain
B. To persuade
C. To inform
D. To analyze

Answer: C

Explanation:
The author' s primary purpose in writing this essay is to inform. The reading comprehension section of the HESI exam will include a few questions that ask you to determine the purpose of the author. The answer choices are always the same: The author's purpose is to entertain, to persuade, to inform, or to analyze. When an author is writing to entertain, he or she is not including a great deal of factual information; instead, the focus is on vivid language and interesting stories. Writing to persuade means "trying to convince the reader of something." When a writer is just trying to provide the reader with information, without any particular bias, he or she is writing to inform. Finally, writing to analyze means to consider a subject already well known to the reader. For instance, if the above passage took an objective look at the pros and cons of various approaches to fighting disease, we would say that the passage was a piece of analysis. Because the purpose of this passage is to present new information to the reader in an objective manner, however, it is clear that the author's intention is to inform.

Question: 10

What is the subject of the passage?

A. Foodborne illnesses
B. The dangers of uncooked food
C. Bacteria
D. Proper food preparation

Answer: A

Explanation:
The subject of this passage is foodborne illnesses. Identifying the subject of a passage is similar

to identifying the main idea. Do not assume that the first sentence of the passage will declare the subject. Oftentimes, an author will approach his or her subject by first describing some related, familiar subject. In this passage, the author does introduce the subject of the passage in the first sentence. However, it is only by reading the rest of the passage that you can determine the subject. One way to figure out the subject of a passage is to identify the main idea of each paragraph, and then identify the common thread in each.

Question: 11

Which statement is NOT a detail from the passage?

A. Every year, more than 70 million Americans contract some form of foodborne illness.
B. Once food is cooked, it cannot cause illness.
C. Refrigeration can slow the growth of some bacteria.
D. The most common form of contamination in handled foods is calicivirus.

Answer: B

Explanation:
This passage never states that cooked food cannot cause illness. Indeed, the first sentence of the third paragraph states that harmful bacteria can be present on cooked food that is left out for two or more hours. This is a direct contradiction of answer choice B. If you can identify an answer choice that is clearly contradicted by the text, you can be sure that it is not one of the ideas advanced by the passage. Sometimes the correct answer to this type of question will be something that is contradicted in the text: on other occasions, the correct answer will be a detail that is not included in the passage at all.

Question: 12

What is the meaning of the word pathogens as it is used in the first paragraph?

A. Diseases
B. Vaccines
C. Disease-causing substances
D. Foods

Answer: C

Explanation:
In the first paragraph, the word pathogens means "disease-causing substances." The vocabulary you are asked to identify in the reading comprehension section of the HESI exam will tend to be health related. The makers of the HESI are especially interested in your knowledge of the terminology' used by doctors and nurses. Some of these words, however, are rarely used in normal conversation, so they may be unfamiliar to you. The best way to determine the meaning of an unfamiliar word is to examine how it is used in context. In the last sentence of the first paragraph, it is clear that pathogens are some substances that cause disease. Note that the pathogens are not

diseases themselves: we would not say that an uncooked piece of meat "has a disease," but rather that consuming it "can cause a disease." For this reason, answer choice C is better than answer choice A.

Question: 13

What is the meaning of the word sterile as it is used in the second paragraph?

A. Free of bacteria
B. Healthy
C. Delicious
D. Impotent

Answer: A

Explanation:
In the second paragraph, the word sterile means "free of bacteria." This question provides a good example of why you should always refer to the word as it is used in the text. The word sterile is often used to describe "a person who cannot reproduce." If this definition immediately came to mind when you read the question, you might have mistakenly chosen answer D. However, in this passage the author describes raw foods as not sterile, meaning that they contain bacteria. For this reason, answer choice A is the correct response.

Question: 14

What is the main idea of the passage?

A. The digestive system is complex.
B. Of all the digestive organs, the stomach is the most prone to bleeding.
C. Both the esophagus and the stomach are subject to bleeding problems.
D. Esophagitis afflicts the young and old alike.

Answer: C

Explanation:
The main idea of the passage is that both the esophagus and the stomach are subject to bleeding problems. The structure ofthis passage is simple: The first paragraph discusses bleeding disorders of the esophagus, and the second paragraph discusses bleeding disorders of the stomach. Remember that statements can be true, and can even be explicitly stated in the passage, and can yet not be the main idea of the passage. The main idea given in answer choice A is perhaps true, but is too general to be classified as the main idea of the passage.

Question: 15

Which statement is NOT a detail from the passage?

A. Alcohol can cause stomach bleeding.
B. Ulcer disease rarely occurs in the stomach.
C. Benign tumors rarely result in massive bleeding.
D. Childbirth is one cause of Mallory-Weiss syndrome.

Answer: B

Explanation:
The passage never states that ulcer disease rarely occurs in the stomach. On the contrary, in the second paragraph the author states that ulcer disease can affect the blood vessels in the stomach. The three other answer choices can be found within the passage. The surest way to answer a question like this is to comb through the passage, looking for each detail in turn. This is a time-consuming process, however, so you may want to follow any initial intuition you have. In other words, if you are suspicious of one of the answer choices, see if you can find it in the passage. Often you will find that the detail is expressly contradicted by the author, in which case you can be sure that this is the right answer.