Name_____
Date_____

Intermediate Critical Reading – Hybrid Vehicles

A hybrid vehicle is a vehicle which uses two or more kinds of propulsion. Most hybrid vehicles use a conventional gasoline engine as well as an electric motor to provide power to the vehicle. These are usually called hybrid-electric-vehicles, or HEVs. Hybrids use two types of propulsion in order to use gasoline more efficiently than conventional vehicles do. Most hybrid vehicles use the gasoline engine as a generator which sends power to the electric motor. The electric motor then powers the car. In conventional vehicles, the gasoline engine powers the vehicle directly.

Since the main purpose of using a hybrid system is to efficiently use resources, most hybrid vehicles also use other efficient systems. Most hybrid vehicles have regenerative braking systems. In conventional vehicles, the gasoline engine powers the brakes, and the energy used in braking is lost. In regenerative braking systems, the energy lost in braking is sent back into the electrical battery for use in powering the vehicle. Some hybrid vehicles use periodic engine shut-off as a gas–saving feature. When the vehicle is in idle, the engine temporarily turns off. When the vehicle is put back in gear, the engine comes back on. Some hybrids use tires made of a stiff material which rolls easily and prevents drag on the vehicle.

Hybrid vehicles save up to 30% of the fuel used in conventional vehicles. Since hybrid vehicles use less gasoline, the cost of operating them is less than the cost of operating conventional vehicles. Therefore, hybrid vehicles are gaining in popularity. According to a recent study, over the five years it typically takes for a person to pay for a car, a typical hybrid car driver would save over $6,000 in gasoline costs. Almost all the world's major automakers are planning and producing safe and comfortable hybrid vehicles to meet the demand for these increasingly popular vehicles.

Although hybrid vehicles do represent a marked improvement in environmentally conscious engineering, there still remains one significant potential drawback: battery disposal. Batteries are difficult to dispose of in an environmentally safe manner. To properly dispose of the battery in a hybrid car requires substantial effort. If the battery is not disposed of properly, the environmental impact of a hybrid car can be equal, if not greater than, that of a regular gas only car.

Since hybrid vehicles use less gasoline than conventional vehicles, they put fewer emissions into the atmosphere than conventional vehicles do. As hybrids become more popular, conventional vehicles are being used less, and the level of emissions being put into the air is decreasing. Hybrid vehicles are an example of an energy-efficient technology that is good for both consumers and the environment.

Questions

1. According to the passage, which of the following statements is/are true?

   I) Two braking systems are used in most hybrid vehicles.
   II) Approximately 30% of vehicles on the road are hybrid vehicles.
   III) Some HEVs have engines which turn off when the vehicle is not moving.

   A) I only
   B) II only
   C) III only
   D) I and II only
   E) II and III only

2. According to the passage, HEVs use two types of propulsion mainly in order to

   A) go faster.
   B) use gasoline efficiently.
   C) provide a comfortable ride.
   D) provide a safe driving experience.
   E) put fewer emissions into the atmosphere.

3. In line 9, *regenerative* most closely means

   A) electric
   B) gasoline
   C) powerful
   D) restorative
   E) second–generation

4. In the context of the passage, which of the following best articulates how the author regards the topic?

   A) Conventional vehicles may be more powerful than hybrid vehicles, but hybrid vehicles are the more socially responsible vehicles to operate.
   B) Since hybrid vehicles use less gasoline and put fewer emissions into the atmosphere than conventional vehicles, they are better for drivers and for the environment.
   C) Conventional vehicles are faster than hybrid vehicles, but hybrid vehicles are better for the environment than conventional vehicles.
   D) Since hybrid vehicles are much less expensive to purchase and operate than conventional vehicles, they are a smarter buy than conventional vehicles.
   E) Two sources of propulsion provide more power to a hybrid vehicle, making it more powerful and faster than a conventional vehicle, so it is more socially responsible to buy a conventional vehicle.

Answers and Explanations

1. The correct answer is **C**.

   I) Incorrect. According to line 1, "A hybrid vehicle is a vehicle which uses two or more kinds of *propulsion*," **not** *braking systems*. While line 9 states that "Most hybrid vehicles have regenerative braking systems," there is **no** mention that they use any additional type of braking system.

   II) Incorrect. While line 16 states that "Hybrid vehicles save up to 30% of the fuel used in conventional vehicles," there is **no** mention of the percentage of hybrid vehicles on the road.

   III) Correct. Some HEVs have engines which turn off when the vehicle is not moving. According to line 13, "When the vehicle is in idle, the engine temporarily turns off."

   A) I only
   B) II only
   C) III only
   D) I and II only
   E) II and III only

2. The correct answer is **B**.

   A) Incorrect. There is **no** mention of the vehicles' speed anywhere in the passage.
   B) Correct. According to line 8, "the *main* purpose of using a hybrid system is to efficiently use resources," and lines 16–17 and 23 state that "hybrid vehicles use less gasoline," and since the fuel source, or *resource*, of conventional vehicles is *gasoline*, this is the correct answer.
   C) Incorrect. While line 21 states that "automakers are planning and producing safe and *comfortable* hybrid vehicles," line 8 states that "the *main* purpose of using a hybrid system is to efficiently use resources."
   D) Incorrect. While line 21 states that "automakers are planning and producing *safe* and comfortable hybrid vehicles," line 8 states that "the *main* purpose of using a hybrid system is to efficiently use resources."
   E) Incorrect. While lines 29-30 state that hybrid vehicles "*put fewer emissions into the atmosphere* than conventional vehicles do," line 8 states that "the *main* purpose of using a hybrid system is to efficiently use resources."

3. The correct answer is **D**.

   A) Incorrect. According to lines 11–12, "In *regenerative* braking systems, the energy lost in braking is sent back into the electrical battery for use in powering the vehicle." If the braking systems were *electric*, the energy would come from the electric system; it would not be sent to the electrical system. So *regenerative* **cannot** mean *electric*.
   B) Incorrect. According to lines 10–12, "In conventional vehicles, the *gasoline* engine powers the brakes, and the energy used in braking is lost. In *regenerative* braking systems, the energy lost in braking is sent back into the electrical battery for use in

powering the vehicle." Since *gasoline* engines are compared to systems which use *regenerative* braking, *gasoline* **cannot** mean the same as *regenerative*.

C) Incorrect. Lines 8–9 state that "most hybrid vehicles also use other *efficient* systems. Most hybrid vehicles have *regenerative* braking systems." Although it is possible that an *efficient* system could be *powerful*, power is not its main attribute – efficiency is. So it is **unlikely** that *regenerative* means *powerful*.

D) Correct. According to lines 11–12, "In *regenerative* braking systems, the energy lost in braking is *sent back* into the electrical battery for use in powering the vehicle." So the energy puts *back* or *restores* the electrical battery's power, which means that the word *regenerative* is **likely** to mean *restorative*.

E) Incorrect. Since the word *regenerative* contains the prefix *re–* and the root word *generative*, it seems logical that it could mean *second–generation*, especially coupled with the idea that hybrid vehicles are a new type or new generation of vehicles. However, the sentence in lines 11–12, "In *regenerative* braking systems, the energy lost in braking is sent back into the electrical battery for use in powering the vehicle" seems to indicate that the word *regenerative* describes the *action or function* of the braking system **rather than** its place in vehicular genealogy.

4. The correct answer is **B.**

A) Incorrect. While it may be true that conventional vehicles are more powerful than hybrid vehicles, there is **no** mention **in the passage** that conventional vehicles are more powerful than hybrid vehicles.

B) Correct. In the last paragraph, the author makes all of these points. Lines 16-17 state that "Since hybrid vehicles use less gasoline than conventional vehicles, they put fewer emissions into the atmosphere than conventional vehicles do." Lines 32-33 state that "Hybrid vehicles are an example of an energy–efficient technology that is good for both consumers and the environment." The author does mention the potential drawbacks in improper battery disposal, but this does not contradict their overall view regarding the benefit of hybrid vehicle usage.

C) Incorrect. While it may be true that conventional vehicles are faster than hybrid vehicles, there is **no** mention **in the passage** that conventional vehicles are faster than hybrid vehicles.

D) Incorrect. While lines 16-17 state that "Since hybrid vehicles use less gasoline, the cost of *operating* them is less than the cost of operating conventional vehicles," there is **no** mention of the cost of *purchasing* hybrid vehicles.

E) Incorrect. There is **no** mention in the passage that two sources of propulsion make the hybrid vehicle either more powerful or faster.