H2GP SPRINT: PRE-ASSESSMENT

1. What is the purpose of the engineering design process?
   A. To follow a strict set of instructions
   B. To solve problems through iterative steps (correct)
   C. To eliminate the need for collaboration
   D. To design without testing

2. What does a fuel cell do?
   A. Stores electrical energy
   B. Converts chemical energy into electricity (correct)
   C. Generates heat for engines
   D. Burns hydrogen for propulsion

3. Which material is used in electrolysis to produce hydrogen?
   A. Wood
   B. Water (correct)
   C. Plastic
   D. Aluminum

4. What does the term 'gear ratio' refer to?
   A. The number of gears in a system
   B. The ratio of output to input teeth on gears (correct)
   C. The speed of the output gear
   D. The size of the driver gear

5. What is the primary advantage of green hydrogen?
   A. It is inexpensive to produce
   B. It generates no carbon emissions (correct)
   C. It uses fossil fuels
   D. It can only be produced outdoors

6. Which of the following is a measure of central tendency?
   A. Range
   B. Mean (correct)
   C. Variance
   D. Standard deviation

7. What is the purpose of testing a design?
   A. To finalize the product
   B. To identify and fix problems (correct)
   C. To showcase the finished product
   D. To complete documentation

8. A car travels 15 meters in 3 seconds. What is its average speed?
   A. 3 m/s
   B. 4 m/s
   C. 5 m/s (correct)
   D. 6 m/s

9. If a car accelerates uniformly from 2 m/s to 8 m/s in 2 seconds, what is the magnitude of its acceleration?
   A. 3 m/s^2 (correct)
   B. 4 m/s^2
   C. 5 m/s^2
   D. 6 m/s^2

10. A gear train has an input gear with 20 teeth and an output gear with 60 teeth. What is the gear ratio?
   A. 1:2
   B. 2:1
   C. 3:1 (correct)
   D. 1:3

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1. What does standard deviation tell us about trial data?
   A. The average speed of the car
   B. The range of data points
   C. How consistent the data is (correct)
   D. The middle value of the data

2. What is the most important reason to align gears correctly?
   A. To make the car faster
   B. To prevent gear slipping or wear (correct)
   C. To improve aesthetic appeal
   D. To increase torque

3. Which measure of central tendency would be most affected by an outlier?
   A. Mean (correct)
   B. Median
   C. Mode
   D. Standard deviation

4. What happens during electrolysis?
   A. Water is split into hydrogen and oxygen (correct)
   B. Hydrogen is burned to produce electricity
   C. Gears are aligned for maximum efficiency
   D. The car is calibrated for speed

5. How does adjusting the gear ratio affect performance?
   A. Increases battery efficiency
   B. Changes speed and torque balance (correct)
   C. Makes the car quieter
   D. Aligns the axles

6. A car travels 10 meters in 5 seconds. What is its average speed?
   A. 1 m/s
   B. 2 m/s (correct)
   C. 5 m/s
   D. 10 m/s

7. If a car accelerates uniformly from rest to 6 m/s in 3 seconds, what is the magnitude of its acceleration?
   A. 1 m/s^2
   B. 2 m/s^2
   C. 2.5 m/s^2 (correct)
   D. 3 m/s^2

8. A gear train has an input gear with 10 teeth and an output gear with 50 teeth. What is the gear ratio?
   A. 1:5
   B. 5:1 (correct)
   C. 10:1
   D. 50:1

9. A car moves with a constant velocity of 3 m/s for 4 seconds. What distance does it cover?
   A. 12 meters (correct)
   B. 6 meters
   C. 8 meters
   D. 16 meters

10. Why is it important to test multiple variables separately?
   A. To simplify testing
   B. To accurately identify cause-effect relationships (correct)
   C. To save time
   D. To reduce errors