

**Fairfax High School Science Olympiad Invitational Tournament:**  
**Hovercraft Written Test**

School Name:

Team Members:

For numbers 1-15 choose the best answer and bubble its letter on your answer key.

<p>1. If the sum of all the forces acting on a car is zero, then the speed of the car always</p> <p>A) Decreases            B) Increases            C) Remains the same            D) Both increases and decreases</p>	<p>2. Which statement about the movement of an object with zero acceleration is true?</p> <p>A) The object must be at rest            B) The object must be slowing down            C) The object may be speeding up            D) The object may be in motion</p>
<p>3. When an unbalanced force of 20N is applied to an object whose mass is 4.0kg, the acceleration (in <math>m/s^2</math>) of the object will be</p> <p>A) 80            B) 5            C) 9.8            D) 0.20</p>	<p>4. What force is necessary to give a 1.0 kg mass initially at rest an acceleration of <math>5.0 m/s^2</math>?</p> <p>A) 0.4 N            B) 0.2 N            C) 6.0 N            D) 5.0 N</p>
<p>5. An elevator containing a man 800 N is rising at a constant speed. The force exerted by the man on the floor of the elevator is</p> <p>A) Less than 80 N            B) Between 80N and 800N            C) 800N            D) More than 800 N</p>	<p>6. An 800N person is standing in an elevator. If the upward force of the elevator on the person is 900N, the person is</p> <p>A) At rest            B) Accelerating upward            C) Accelerating downward            D) Moving downward at a constant speed</p>
<p>7. If an object is traveling east with a decreasing speed, the direction of the object's net force is</p> <p>A) North            B) South            C) East            D) West</p>	<p>8. Karar kicks a 2.0 kg-ball at 2.0 m/s toward a wall. The ball hits the wall and <b>rebounds</b> at 1.5 m/s. The magnitude of the change in the momentum of the ball is:</p> <p>A) 0.0 N s            B) 0.5 N s            C) 3.5 N s            D) 7.0 N s</p>

<p>9. A 30kg boy exerts a force of 100N on a 50kg object. The force that the object exerts on the boy is</p> <p>A) 0 N  B) 100 N  C) 980 N  D) 1,500 N</p>	<p>10. If the magnitude of the gravitational force of Earth on the Moon is <math>F</math>, the magnitude of the gravitational force of the moon on Earth is</p> <p>A) Smaller than <math>F</math>  B) Larger than <math>F</math>  C) Equal to <math>F</math>  D) Impossible to compare</p>
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11. A hovercraft should not be used on the moon because

- A) There's not enough gravity
- B) There's no air pressure
- C) The terrain is too rugged
- D) There's no water on the moon

12. For a hovercraft to successfully hover across water, which of these **must** be equal to zero?

- A) The kinetic energy
- B) The inertia
- C) The net force in the horizontal direction
- D) The net force in the vertical direction
- E) The momentum

13. What advantage do hovercraft have over traditional watercraft?

- A) Gravity doesn't act on hovercraft
- B) Hovercraft have more potential energy
- C) Friction is negligible
- D) Hovercraft have greater inertia compared to traditional watercraft of equal mass

14. The first practical use of the hovercraft was during which time period?

- A) 1910s
- B) 1930s
- C) 1950s
- D) 1980s
- E) After 2000

15. Which is not a common use for hovercraft transport?

- A) Military
- B) Disaster relief
- C) Passenger service
- D) Sport
- E) All of these are used

For #16 and #17, calculate the following:

16. An apple weighing 1N on the surface of Earth has a mass of approximately:

17. A 60kg astronaut weighs 96N on the surface of the Moon. The acceleration due to gravity (in  $\text{m/s}^2$ ) on the Moon is:

KEY ID  
 A  B  C  D

SCORING & PRINTING OPTIONS:  
 RESCORE  MULTIPLE ANSWER SCORING  
 CORRECT ANSWER  MARK X  TOTAL ONLY  
 MARK ONLY ONE

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FEED IN THIS DIRECTION

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ANSWER KEY INFO

# OF KEYS	ITEM COUNT
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PERFORMANCE ASSESSMENT

	% OF TOTAL SCORE					POINTS EARNED				
	00 = 100%									
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3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7
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#### MARKING INSTRUCTIONS

Use a No. 2 Pencil  
 Fill oval completely  
 Erase cleanly

STUDENT ID NUMBER

0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
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NUMBER CORRECT
PERCENT CORRECT
ROSTER NUMBER
SCORE
RESCORE



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COMBINED POINTS EARNED
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NAME Answer Key  
 SUBJECT Hoover Craft  
 PERIOD \_\_\_\_\_ DATE \_\_\_\_\_



# Short Answer Calculations



#16

Answer  
1kg

#17

Answer  
1.6