

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Physics 5: Pre-test

- The test will cover exercise 1-16 and 19.
- Any questions on these exercises may appear on your test.
- Make sure that you have the correct answers for the exercises and this pre-test by visiting: [www.emsb.qc.ca/laurenhill/physics](http://www.emsb.qc.ca/laurenhill/physics)

1. What is physics?
2. What are the branches of physics? Explain what each branch studies.
3. What were the contributions made by Galileo, Newton, and Einstein to physics?
4. Can you convert mechanical energy completely to electrical energy? Why?
5. What are the 3 divisions of mechanics? Explain what each division studies.
6. What is the basic unit for length, mass, and time?
7. What is a scalar? Give some examples.
8. What is a vector? Give some examples.
9. What is the difference between mass and weight?
10. What is force?
11. What are concurrent forces?
12. Name and explain the 3 Newton's Law of Motion?
13. What is equilibrium?
14. What does the term at rest mean?
15. What are the 3 conditions for a system to be at rest or in equilibrium?
16. Are the following systems at rest?
  - a. A pencil resting on a table.
  - b. A car travelling at a constant speed on a curved road.
  - c. A car speeding on the highway?
  - d. A car travelling at a constant speed on a straight, levelled road.
17. What is the normal force?
18. If an object is hanging by thread, does it have a normal force?
19. Explain why the frictional force ( $f$ ) cannot be greater than the applied force ( $F_A$ )?

20. An astronaut is going to explore the Moon with its gravitational force field only one-sixth the size of Earth's gravitational field. Which of these statements is true?

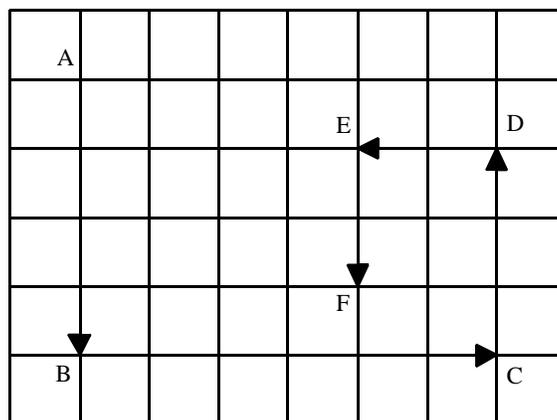
- A) His weight and mass are the same on both the Earth and the Moon.
- B) His weight is the same on both the Earth and the Moon but his mass will be smaller on the Moon.
- C) His weight and his mass are both less on the Moon than on the Earth.
- D) His weight is less on the Moon than on the Earth but his mass will be the same.

21. A few seconds after jumping from an airplane, a parachutist falls at a constant velocity. How can you explain this?

- A) The parachutist is subject to no force.
- B) The force of the air resistance is less than the weight of the parachutist.
- C) The force of the air resistance is greater than the weight of the parachutist.
- D) The resultant of the two forces acting on the parachutist is zero.

22. The following graph represents the trail followed by a hiker going from A to F

(A → B → C → D → E → F). One centimetre represents 100 metres.

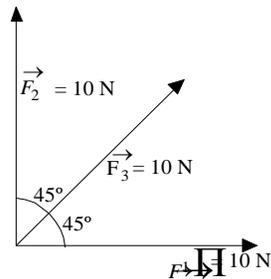


What is the displacement of the hiker?

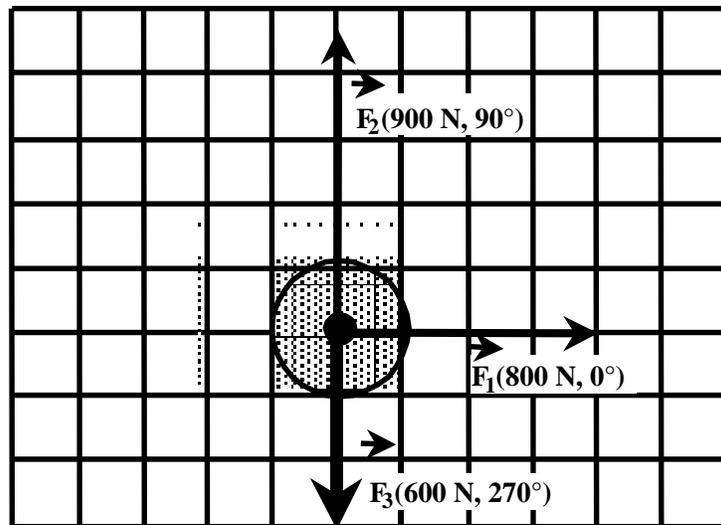
23. To get to LaurenHill Academy, Julia has to travel 500 m North, 400 m East, and 100 m South. What is her total displacement?

24. An electron in the picture tube of a television set is subjected to a magnetic force of  $2.6 \times 10^{-18}$  N acting horizontally and an electric force of  $3.0 \times 10^{-18}$  N acting vertically. What is the magnitude of the resulting force acting on the electron?

25. Three forces of 10 N are applied to a trolley on a horizontal surface. What is the equilibrant force?



26. Three forces act simultaneously on a cart that is free to move in any direction. The magnitude and direction of each force is shown in the diagram below.



Determine the magnitude and direction of the equivalent force. Show all your work.

27. The following two forces are added together:

$$F_1 = 8 \text{ N [} 25^\circ \text{ North of East]}$$

$$F_2 = 10 \text{ N [N } 25^\circ \text{ E]}$$

What is the size and direction of the equilibrant force ( $F_E$ ) for this system?

28. A wooden block, mass 4 kg, is placed on a wooden table top. It is found that a force of 14.0N is required to move the block at constant velocity.

If a 2 kg brick is placed on the block, what force will be required to keep the block and brick moving at constant velocity?

29. In order to pull a loaded wagon at constant velocity along a street, Arpan exerts a force of 150N on the handle of the wagon. The handle makes an angle of  $40^\circ$  with the horizontal. Determine the force due to friction.

30. An inclined plane has an angle of  $20^\circ$ . A box rests motionless on the inclined plane. If the frictional force is 120N, what is the mass of the box?

31. A frictional force of 34N holds a 10kg object on an inclined plane. Calculate the angle of incline.

32. A 6 kg object rests on an inclined plane whose angle of incline is  $25^\circ$ . Determine the frictional force which holds the object at rest.