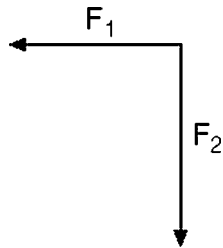
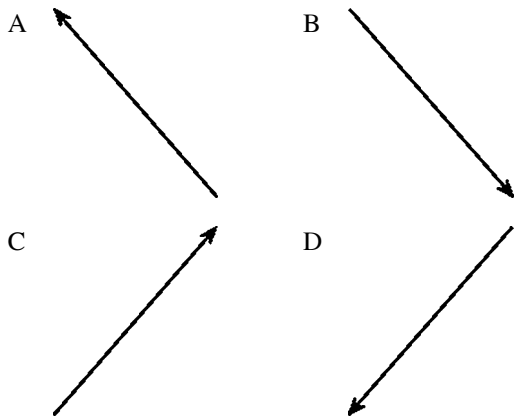


NY Regents Physics Samples

1. A force vector was resolved into two perpendicular components, F_1 and F_2 , as shown in the accompanying diagram.



Which vector best represents the original force?



2. Base your answer(s) to the following question(s) on the information and vector diagram below.

A dog walks 8.0 meters due north and then 6.0 meters due east.

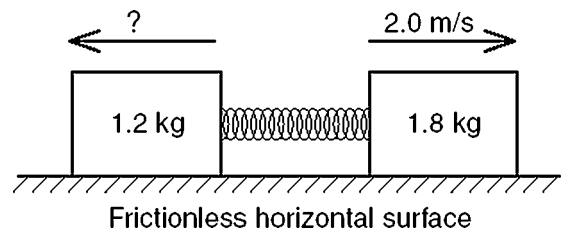


On the diagram above, construct the resultant vector that represents the dog's total displacement.

3. A person walks 5.0 kilometers north, then 5.0 kilometers east. His displacement is closest to

- A 7.1 kilometers northeast
- B 7.1 kilometers northwest
- C 10 kilometers northeast
- D 10 kilometers northwest

4. A 1.2-kilogram block and a 1.8-kilogram block are initially at rest on a frictionless, horizontal surface. When a compressed spring between the blocks is released, the 1.8-kilogram block moves to the right at 2.0 meters per second, as shown.

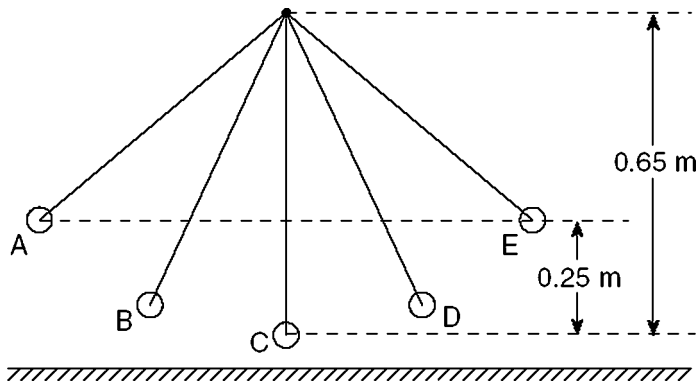


What is the speed of the 1.2-kilogram block after the spring is released?

- A 1.4 m/s
 - B 2.0 m/s
 - C 3.0 m/s
 - D 3.6 m/s
5. The momentum of a 5-kilogram object moving at 6 meters per second is

- A 1 kg · m/sec
- B 5 kg · m/sec
- C 11 kg · m/sec
- D 30 kg · m/sec

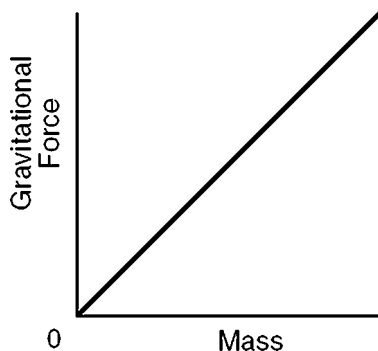
6. A 0.65-meter-long pendulum consists of a 1.0-kilogram mass at the end of a string. The pendulum is released from rest at position A, 0.25 meter above its lowest point. The pendulum is timed at five positions, A through E.



Position	Elapsed Time
A	0.00 s
B	0.20 s
C	0.40 s
D	0.60 s
E	0.80 s

Based on the information in the diagram and the data table, determine the period of the pendulum.

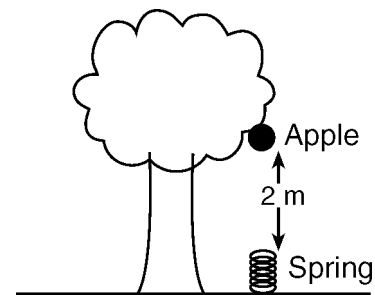
7. The accompanying graph represents the relationship between gravitational force and mass for objects near the surface of Earth.



The slope of the graph represents the

- A acceleration due to gravity
 B universal gravitational constant
 C momentum of objects
 D weight of objects
8. Which type of wave requires a material medium through which to travel?
- A radio wave B microwave
 C light wave D mechanical wave

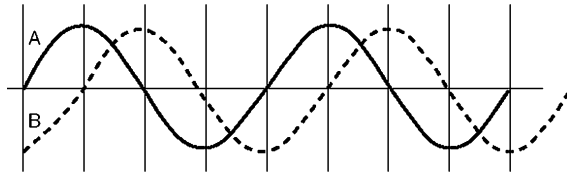
9. The diagram below shows a 0.1-kilogram apple attached to a branch of a tree 2 meters above a spring on the ground below.



The apple falls and hits the spring, compressing it 0.1 meter from its rest position. If all of the gravitational potential energy of the apple on the tree is transferred to the spring when it is compressed, what is the spring constant of this spring?

- A 10 N/m B 40 N/m
 C 100 N/m D 400 N/m
10. In a vacuum, the wavelength of green light is 5×10^{-7} meter. What is its frequency?
- A 2×10^{-15} Hz B 2×10^{-14} Hz
 C 6×10^{14} Hz D 6×10^{15} Hz

11. The accompanying diagram shows two waves, A and B.

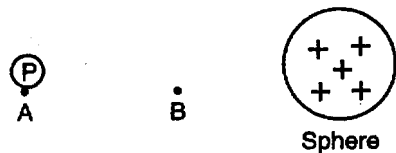


The phase difference between A and B is

- A 0° B 45° C 90° D 180°
12. What happens to the frequency and the speed of an electromagnetic wave as it passes from air into glass?

- A The frequency decreases and the speed increases.
- B The frequency increases and the speed decreases.
- C The frequency remains the same and the speed increases.
- D The frequency remains the same and the speed decreases.

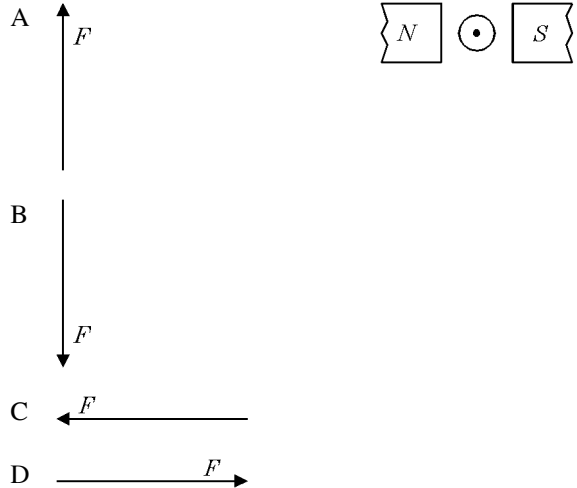
13. The diagram given shows proton *P* located at point A near a positively charged sphere.



If 6.4×10^{-19} joule of work is required to move the proton from point A to point B, the potential difference between A and B is

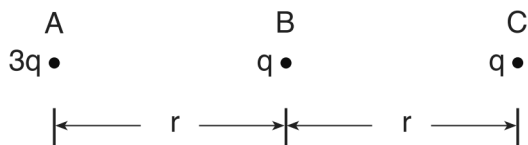
- A 6.4×10^{-19} V B 4.0×10^{-19} V
- C 6.4 V D 4.0 V

14. The diagram shows an end view of a current-carrying wire between the poles of a magnet. The wire is perpendicular to the magnetic field. If the direction of the electron flow is out of the page, which arrow correctly shows the direction of the magnetic force *F* acting on the wire?



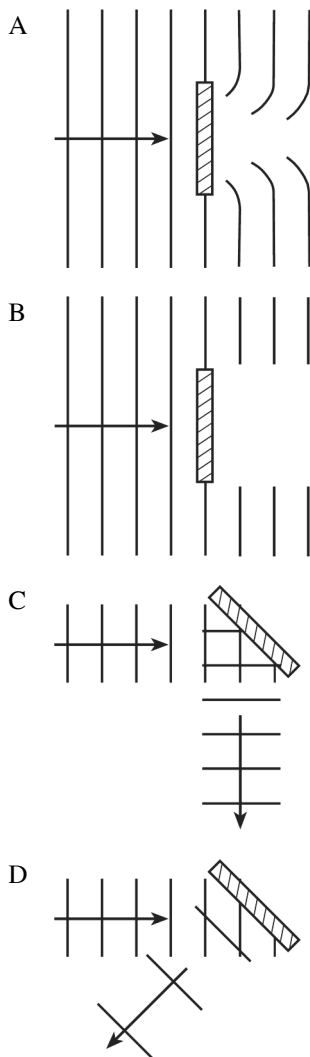
15. Which statement best describes the torque experienced by a current-carrying loop of wire in an external magnetic field?
- A It is due to the current in the loop of wire, only.
- B It is due to the interaction of the external magnetic field and the magnetic field produced by current in the loop.
- C It is inversely proportional to the length of the conducting loop in the magnetic field.
- D It is inversely proportional to the strength of the permanent magnetic field.
16. An electric toaster uses 3.0 amperes of current while operating at 100 volts for 100 seconds. How many calories of heat energy are produced?
- A 7,200 cal B 3,600 cal
- C 2,400 cal D 300 cal

17. The diagram below shows the arrangement of three small spheres, *A*, *B*, and *C*, having charges of $3q$, q , and q , respectively. Spheres *A* and *C* are located distance r from sphere *B*.



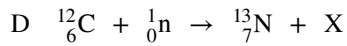
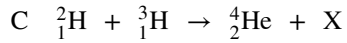
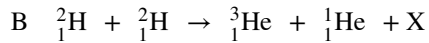
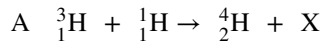
Compared to the magnitude of the electrostatic force exerted by sphere *B* on sphere *C*, the magnitude of the electrostatic force exerted by sphere *A* on sphere *C* is

- A the same B twice as great
 C $\frac{3}{4}$ as great D $\frac{3}{2}$ as great
18. An immersion heater has a resistance of 5.0 ohms while drawing a current of 3.0 amperes. How much electrical energy is delivered to the heater during 200. seconds of operation?
- A 3.0×10^3 J B 6.0×10^3 J
 C 9.0×10^3 J D 1.5×10^4 J
19. An electric circuit consists of a variable resistor connected to a source of constant potential difference. If the resistance of the resistor is doubled, the current through the resistor is
- A halved B doubled
 C quartered D quadrupled
20. Which diagram represents diffraction of wave fronts as they encounter an obstacle?



21. Two neutral atoms are $^{13}_6\text{C}$ and $^{12}_6\text{C}$. They are examples of
- A atoms with the same mass
 B atoms with the same number of neutrons
 C isotopes
 D ions

22. In which nuclear equation does X represent a neutron?



23. According to the Standard Model of Particle Physics, a neutrino is a type of

- A lepton B photon C meson D baryon

24. What is the magnitude of the electrostatic force exerted on an electron by another electron when they are 0.10 meter apart?

A $2.6 \times 10^{-36} \text{ N}$ B $2.3 \times 10^{-27} \text{ N}$

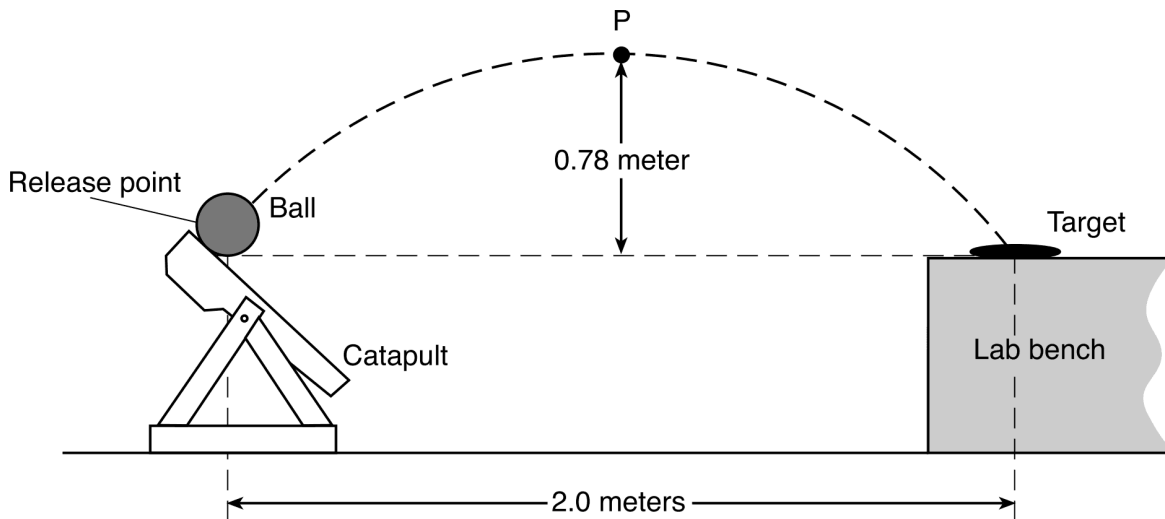
C $2.3 \times 10^{-26} \text{ N}$ D $1.4 \times 10^{-8} \text{ N}$

25. A 2.0-meter length of copper wire is connected across a potential difference of 24 millivolts. The current through the wire is 0.40 ampere. The same copper wire at the same temperature is then connected across a potential difference of 48 millivolts. The current through the wire is

- A 0.20 A B 0.40 A C 0.80 A D 1.6 A

26. Base your answers to the questions on the information and diagram below and on your knowledge of physics.

A group of students constructs a catapult that launches a ball at a target placed on a lab bench. The students measure 0.80 second from the time the ball is released until it strikes the target, located a horizontal distance of 2.0 meters from the release point. The ball reaches a maximum height at point P, which is 0.78 meter above the ball's release point. The target is at the same height as the release point. [Neglect friction.]



(Not drawn to scale)

Calculate the vertical component of the ball's initial velocity. [Show all work, including the equation and substitution with units.]