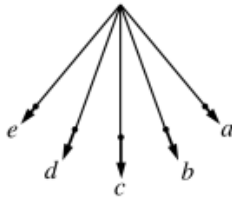


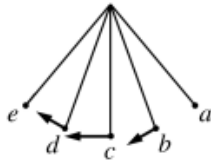
## GRE Physics Practice Test 1

1. Which of the following best illustrates the acceleration of a pendulum bob at points *a* through *e*?

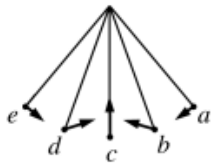
(A)



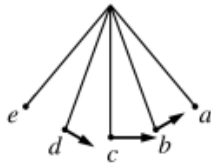
(B)



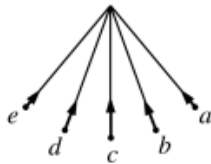
(C)



(D)



(E)



2. The coefficient of static friction between a small coin and the surface of a turntable is 0.30. The turntable rotates at 33.3 revolutions per minute. What is the maximum distance from the center of the turntable at which the coin will not slide?

(A) 0.024 m  
 (B) 0.048 m  
 (C) 0.121 m  
 (D) 0.242 m  
 (E) 0.484 m

3. A satellite of mass  $m$  orbits a planet of mass  $M$  in a circular orbit of radius  $R$ . The time required for one revolution is

(A) independent of  $M$   
 (B) proportional to  $\sqrt{m}$   
 (C) linear in  $R$   
 (D) proportional to  $R^{3/2}$   
 (E) proportional to  $R^2$

4. In a nonrelativistic, one-dimensional collision, a particle of mass  $2m$  collides with a particle of mass  $m$  at rest. If the particles stick together after the collision, what fraction of the initial kinetic energy is lost in the collision?

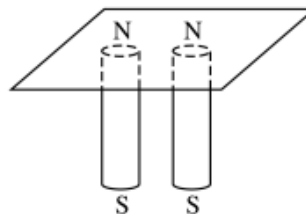
(A) 0  
 (B)  $\frac{1}{4}$   
 (C)  $\frac{1}{3}$   
 (D)  $\frac{1}{2}$   
 (E)  $\frac{2}{3}$

5. A three-dimensional harmonic oscillator is in thermal equilibrium with a temperature reservoir at temperature  $T$ . The average total energy of the oscillator is

- (A)  $\frac{1}{2} kT$   
 (B)  $kT$   
 (C)  $\frac{3}{2} kT$   
 (D)  $3kT$   
 (E)  $6kT$

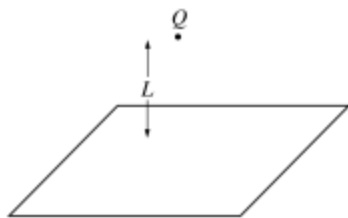
6. An ideal monatomic gas expands quasi-statically to twice its volume. If the process is isothermal, the work done by the gas is  $W_i$ . If the process is adiabatic, the work done by the gas is  $W_a$ . Which of the following is true?

- (A)  $W_i = W_a$   
 (B)  $0 = W_i < W_a$   
 (C)  $0 < W_i < W_a$   
 (D)  $0 = W_a < W_i$   
 (E)  $0 < W_a < W_i$

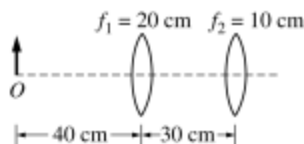


7. Two long, identical bar magnets are placed under a horizontal piece of paper, as shown in the figure above. The paper is covered with iron filings. When the two north poles are a small distance apart and touching the paper, the iron filings move into a pattern that shows the magnetic field lines. Which of the following best illustrates the pattern that results?

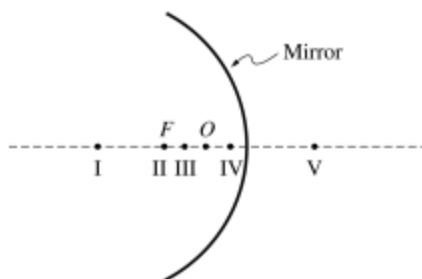
- (A)
- (B)
- (C)
- (D)
- (E)



8. A positive charge  $Q$  is located at a distance  $L$  above an infinite grounded conducting plane, as shown in the figure above. What is the total charge induced on the plane?
- (A)  $2Q$   
 (B)  $Q$   
 (C)  $0$   
 (D)  $-Q$   
 (E)  $-2Q$
9. Five positive charges of magnitude  $q$  are arranged symmetrically around the circumference of a circle of radius  $r$ . What is the magnitude of the electric field at the center of the circle?  
 ( $k = 1/4\pi\epsilon_0$ )
- (A)  $0$   
 (B)  $kq/r^2$   
 (C)  $5kq/r^2$   
 (D)  $(kq/r^2) \cos(2\pi/5)$   
 (E)  $(5kq/r^2) \cos(2\pi/5)$
10. A 3-microfarad capacitor is connected in series with a 6-microfarad capacitor. When a 300-volt potential difference is applied across this combination, the total energy stored in the two capacitors is
- (A) 0.09 J  
 (B) 0.18 J  
 (C) 0.27 J  
 (D) 0.41 J  
 (E) 0.81 J



11. An object is located 40 centimeters from the first of two thin converging lenses of focal lengths 20 centimeters and 10 centimeters, respectively, as shown in the figure above. The lenses are separated by 30 centimeters. The final image formed by the two-lens system is located
- (A) 5.0 cm to the right of the second lens  
 (B) 13.3 cm to the right of the second lens  
 (C) infinitely far to the right of the second lens  
 (D) 13.3 cm to the left of the second lens  
 (E) 100 cm to the left of the second lens



12. A spherical, concave mirror is shown in the figure above. The focal point  $F$  and the location of the object  $O$  are indicated. At what point will the image be located?
- (A) I  
 (B) II  
 (C) III  
 (D) IV  
 (E) V