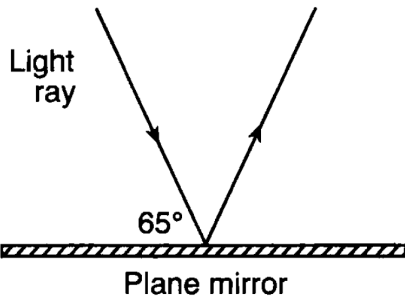# Top 40 Missed Regents Physics Questions - 2015 Review

1. Earth's mass is approximately 81 times the mass of the Moon. If Earth exerts a gravitational force of magnitude *F* on the Moon, the magnitude of the gravitational force of the Moon on Earth is

   A) *F*

   B) $\dfrac{F}{81}$

   C) 9*F*

   D) 81*F*

2. The diagram below represents a light ray reflecting from a plane mirror.

   The angle of reflection for the light ray is

   A) 25°   B) 35°   C) 50.°   D) 65°

3. What is the approximate width of a person's little finger?

   A) 1 m   B) 0.1 m
   C) 0.01 m   D) 0.001 m

4. A truck weighing 3.0×10^4 newtons was driven up a hill that is 1.6×10^3 meters long to a level area that is 8.0×10^2 meters above the starting point. If the trip took 480 seconds, what was the *minimum* power required?

   A) 5.0×10^4 W   B) 1.0×10^5 W
   C) 1.2×10^{10} W   D) 2.3×10^{10} W

5. A sound wave traveling eastward through air causes the air molecules to

   A) vibrate east and west
   B) vibrate north and south
   C) move eastward, only
   D) move northward, only

6. How are electromagnetic waves that are produced by oscillating charges and sound waves that are produced by oscillating tuning forks similar?

   A) Both have the same frequency as their respective sources.
   B) Both require a matter medium for propagation.
   C) Both are longitudinal waves.
   D) Both are transverse waves.

7. Which phenomenon best supports the theory that matter has a wave nature?

   A) electron momentum   B) electron diffraction
   C) photon momentum   D) photon diffraction

8. A circuit consists of a resistor and a battery. Increasing the voltage of the battery while keeping the temperature of the circuit constant would result in an increase in

   A) current, only
   B) resistance, only
   C) both current and resistance
   D) neither current nor resistance

9. Base your answer to the following question on the information below.

   A stream is 30. meters wide and its current flows southward at 1.5 meters per second. A toy boat is launched with a velocity of 2.0 meters per second eastward from the west bank of the stream.

   How much time is required for the boat to reach the opposite bank of the stream?

   A) 8.6 s   B) 12 s   C) 15 s   D) 60. s

10. As a sound wave passes from water, where the speed is 1.49×10^3 meters per second, into air, the wave's speed

   A) decreases and its frequency remains the same
   B) increases and its frequency remains the same
   C) remains the same and its frequency decreases
   D) remains the same and its frequency increases

11. The diagram below represents the magnetic field near point *P*.
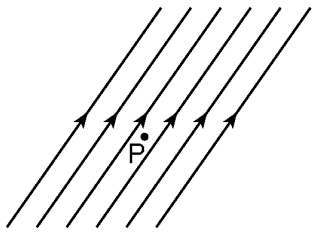
If a compass is placed at point *P* in the same plane as the magnetic field, which arrow represents the direction the north end of the compass needle will point?

A)

B)

C)

D)

12. An earthquake is traveling from the west to east through rock. If the particle are vibrating in a north-south direction, the wave must be classified as

A) transverse
B) longitudinal
C) a microwave
D) a radio wave

13. Which object has the greatest inertia?

A) a 1.0-kilogram object moving at 15 meters per second
B) a 5.0-kilogram object at rest
C) a 10.-kilogram object moving at 2.0 meters per second
D) a 15-kilogram object at rest

14. A block weighing 40. newtons is released from rest on an incline 8.0 meters above the horizontal, as shown in the diagram below.
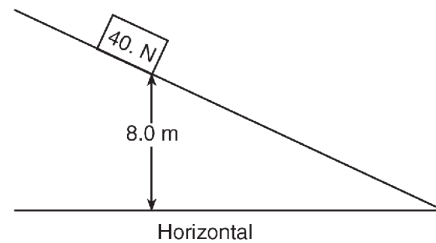
If 50. joules of heat is generated as the block slides down the incline, the maximum kinetic energy of the block at the bottom of the incline is

A) 50. J
B) 270 J
C) 320 J
D) 3100 J

15. What is the speed of a radio wave in a vacuum?

A) 0 m/s
B) 3.31×10^2 m/s
C) 1.13×10^3 m/s
D) 3.00×10^8 m/s

16. What is the magnitude of the force needed to keep a 60.-newton rubber block moving across level, dry asphalt in a straight line at a constant speed of 2.0 meters per second?

A) 40. N   B) 51 N   C) 60. N   D) 120 N

17. A 512-hertz sound wave travels 100. meters to an observer through air at STP. What is the wavelength of this sound wave?

A) 0.195 m
B) 0.646 m
C) 1.55 m
D) 5.12 m

18. Base your answer to the following question on the information and table below.

   The weight of an object was determined at five different distances from the center of Earth. The results are shown in the table below. Position A represents results for the object at the surface of Earth.

Position	Distance from Earth's Center (m)	Weight (N)
A	6.37×10^6	1.0×10^3
B	1.27×10^7	2.5×10^2
C	1.91×10^7	1.1×10^2
D	2.55×10^7	6.3×10^1
E	3.19×10^7	4.0×10^1

At what distance from the center of Earth is the weight of the object approximately 28 newtons?

A) 3.5×10^7 m   B) 3.8×10^7 m

C) 4.1×10^7 m   D) 4.5×10^7 m

19. The diagram below represents a lamp, a 10-volt battery, and a length of nichrome wire connected in series.
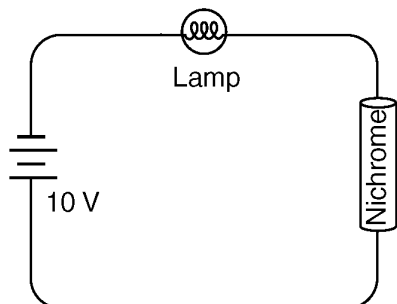
As the temperature of the nichrome is decreased, the brightness of the lamp will

A) decrease   B) increase
C) remain the same

20. A wave passes through an opening in a barrier. The amount of diffraction experienced by the wave depends on the size of the opening and the wave's

A) amplitude   B) wavelength
C) velocity   D) phase

21. In the diagram below, a block of mass M initially at rest on a frictionless horizontal surface is struck by a bullet of mass 1 moving with horizontal velocity v.
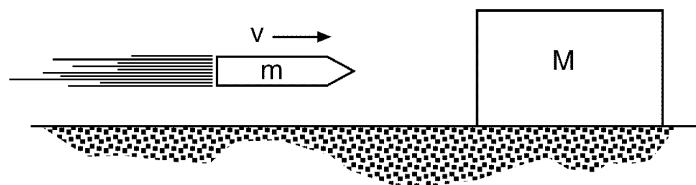

What is the velocity of the bullet-block system after the bullet embeds itself in the block?

A) $\left(\dfrac{M + v}{M} \right) m$

B) $\left(\dfrac{m + M}{m} \right) v$

C) $\left(\dfrac{m + v}{M} \right) m$

D) $\left(\dfrac{m}{m + M} \right) v$

22. The energy produced by the complete conversion of 2.0 $\times 10^{-5}$ kilogram of mass into energy is

A) 1.8 TJ   B) 6.0 GJ
C) 1.8 MJ   D) 6.0 kJ

23. A 2.00-kilogram object weighs 19.6 newtons on Earth. If the acceleration due to gravity on Mars is 3.71 meters per second^2 , what is the object's mass on Mars?

A) 2.64 kg   B) 2.00 kg
C) 19.6 N   D) 7.42 N

24. The diagram below represents two pulses approaching each other.
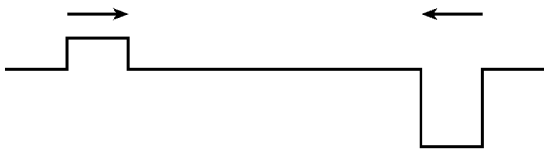
Which diagram best represents the resultant pulse at the instant the pulses are passing through each other?

A)   B)   C) _____   D)
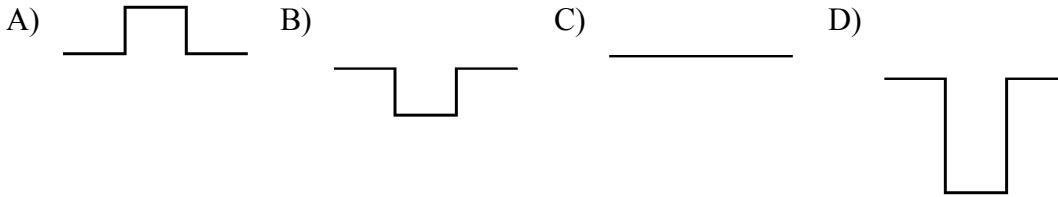
25. What is the wavelength of a light ray with frequency 5.09×10^{14} hertz as it travels through Lucite?

   A) 3.93×10^{-7} m   B) 5.89×10^{-7} m
   C) 3.39×10^{14} m   D) 7.64×10^{14} m

26. What is the period of a 60.-hertz electromagnetic wave traveling at 3.0×10^8 meters per second?

   A) 1.7×10^{-2} s   B) 2.0×10^{-7} s
   C) 6.0×10^1 s   D) 5.0×10^6 s

27. A car's horn produces a sound wave of constant frequency. As the car speeds up going away from a stationary spectator, the sound wave detected by the spectator

   A) decreases in amplitude and decreases in frequency
   B) decreases in amplitude and increases in frequency
   C) increases in amplitude and decreases in frequency
   D) increases in amplitude and increases in frequency

28. Moving electrons are found to exhibit properties of

   A) particles, only
   B) waves, only
   C) both particles and waves
   D) neither particles nor waves

29. A tuning fork vibrating in air produces sound waves. These waves are best classified as

   A) transverse, because the air molecules are vibrating parallel to the direction of wave motion
   B) transverse, because the air molecules are vibrating perpendicular to the direction of wave motion
   C) longitudinal, because the air molecules are vibrating parallel to the direction of wave motion
   D) longitudinal, because the air molecules are vibrating perpendicular to the direction of wave motion

30. Parallel wave fronts incident on an opening in a barrier are diffracted. For which combination of wavelength and size of opening will diffraction effects be greatest?

   A) short wavelength and narrow opening
   B) short wavelength and wide opening
   C) long wavelength and narrow opening
   D) long wavelength and wide opening

31. A photon having an energy of 9.40 electronvolts strikes a hydrogen atom in the ground state. Why is the photon *not* absorbed by the hydrogen atom?

   A) The atom's orbital electron is moving too fast.
   B) The photon striking the atom is moving too fast.
   C) The photon's energy is too small.
   D) The photon is being repelled by electrostatic force.

32. Two waves having the same frequency and amplitude are traveling in the same medium. Maximum constructive interference occurs at points where the phase difference between the two superposed waves is

   A) 0°   B) 90°   C) 180°   D) 270°

33. A 4.50-volt personal stereo uses 1950 joules of electrical energy in one hour. What is the electrical resistance of the personal stereo?

   A) 433 Ohms   B) 96.3 Ohms
   C) 37.4 Ohms   D) 0.623 Ohms

34. A device operating at a potential difference of 1.5 volts draws a current of 0.20 ampere. How much energy is used by the device in 60. seconds?

   A) 4.5 J   B) 8.0 J   C) 12 J   D) 18 J

35. Which is an SI unit for work done on an object?

A) $\dfrac{kg \cdot m^2}{s^2}$ 　　　 B) $\dfrac{kg \cdot m^2}{s}$

C) $\dfrac{kg \cdot m}{s}$ 　　　 D) $\dfrac{kg \cdot m}{s^2}$

36. Base your answer to the following question on the diagram below, which shows a 1.0-newton metal disk resting on an index card that is balanced on top of a glass.

Metal disk
Index card
Glass
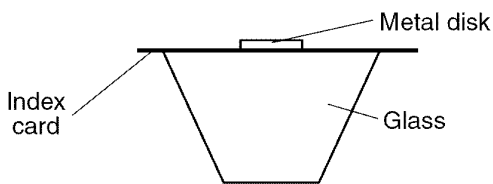
What is the net force acting on the disk?

A) 1.0 N 　B) 2.0 N 　C) 0 N 　 D) 9.8 N

37. Which vector diagram best represents a cart slowing down as it travels to the right on a horizontal surface?

A)

B)

C)

D)
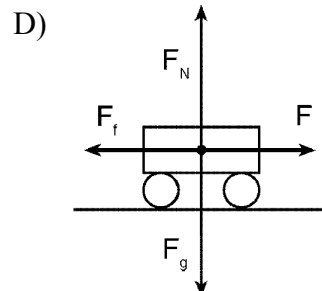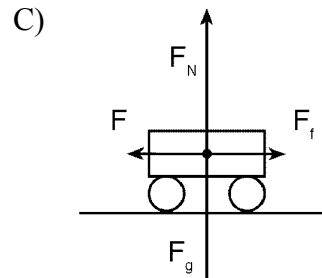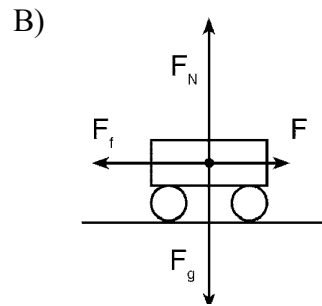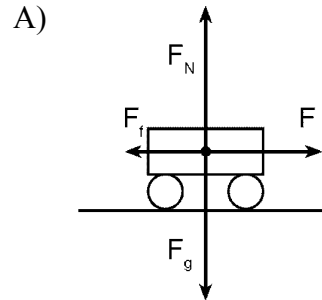
38. How much electrical energy is required to move a 4.00-microcoulomb charge through a potential difference of 36.0 volts?

A) 9.00×10^6 J 　　　 B) 144 J

C) 1.44×10^{-4} J 　　　 D) 1.11×10^{-7} J

39. When a 1.53-kilogram mass is placed on a spring with a spring constant of 30.0 newtons per meter, the spring is compressed 0.500 meter. How much energy is stored in the spring?

A) 3.75 J 　B) 7.50 J 　C) 15.0 J 　D) 30.0 J

Answer Key
Top 40 Most Missed - 2015

1.   **A**
2.   **A**
3.   **C**
4.   **A**
5.   **A**
6.   **A**
7.   **B**
8.   **A**
9.   **C**
10. **A**
11. **B**
12. **A**
13. **D**
14. **B**
15. **D**
16. **A**
17. **B**
18. **B**
19. **B**
20. **B**
21. **D**
22. **A**
23. **B**
24. **B**
25. **A**
26. **A**
27. **A**
28. **C**
29. **C**
30. **C**
31. **C**
32. **A**
33. **C**
34. **D**
35. **A**

36. **C**
37. **B**
38. **C**
39. **A**
40. **A**