Question 1

Not yet answered

Flag question

The top end of a 6 m long and 3×10^{-6} m^2 cross sectional area wire is attached to a ceiling, and the wire is suspended vertically downward. If a 120 kg mass is attached to the bottom end of the wire, and the wire's Young's modulus is 6×10^{10} N/m^2, what will be the change in length?

A. 0.05 m

B. 0.04 m

C. 0.06 m

D. 0.02 m

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Question 2

Not yet answered

Flag question

The speed of sound in air at 0 °C is 331.0 m/s. What is the approximate speed of sound in air at 27 °C?

- A. 346.4 m/s
- B. 358.0 m/s
- C. 434.9 m/s
- D. 331.0 m/s

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Question 3

Not yet answered

Flag question

If the coefficients of thermal expansion of a material are designated by α for the linear expansion, β for the surface (area) expansion, and γ for volume expansion, these parameters are related as

A. $\gamma = 2\alpha$

B. $2\beta = 3\gamma$

C. $3\beta = 2\gamma$

D. $\beta = 3\alpha$

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Question 4

Not yet answered

Flag question

The amount of electric charge on a particle or object is an integral multiple of the charge of an electron. This property indicates

- A. charge creation.
- B. charge induction.
- C. charge quantization.
- D. charge conservation.

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Question 5

Not yet answered

Flag question

A 25 kg box is dragged on a rough horizontal x-y-plane from $\vec{r}_1 = (1.3\,\hat{\imath} + 1.4\,\hat{\jmath})$ m to $\vec{r}_2 = (8.3\,\hat{\imath} + 2.9\,\hat{\jmath})$ m by a force $\vec{F} = (4\,\hat{\imath} - 6\,\hat{\jmath})$. How much work is done by the force?

- A. 19.0 J
- B. 37.0 J
- C. 15.8 J
- D. 75.6 J

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Question 6

Not yet answered

Flag question

Two resistors with resistance of 3 Ω and 6 Ω are connected in parallel, and their combination is connected in series to 4 Ω resistor. If the overall combination of the resistors is connected to a 12 V source, how much is the voltage drop across the 6 Ω resistor?

- A. 8 V
- B. 4 V
- C. 2 V
- D. 12 V

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Question 7

Not yet answered

Flag question

Which of the following is true about anechoic images of tissues in ultrasound imaging? They appear on the screen as

- A. black because the tissues do not reflect any sound wave.
- B. light gray because the tissues do not reflect any sound wave.
- C. black because the tissues reflect intense sound waves.
- D. light gray because the tissues reflect intense sound waves.

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Question 8

Not yet answered

Flag question

A constant force of 250.0 N is applied horizontally on a box that lays on a horizontal frictionless surface. If the box accelerates with 4.0 m/s^2, what is its mass?

- A. 125.0 kg
- B. 41.7 kg
- C. 10.4 kg
- D. 62.5 kg

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Question 9

Not yet answered

Flag question

A stream of water from a wide river enters a narrower and shallow gate of a lake. Which one of the following statements is true?

- A. The speed of the water decreases as it enters the gate of the lake.
- B. The speed of the water increases as it enters the gate of the lake.
- C. The density of the water entering the lake is higher than the water leaving the river.
- D. The volume of the water entering the lake is higher than the water leaving the river.

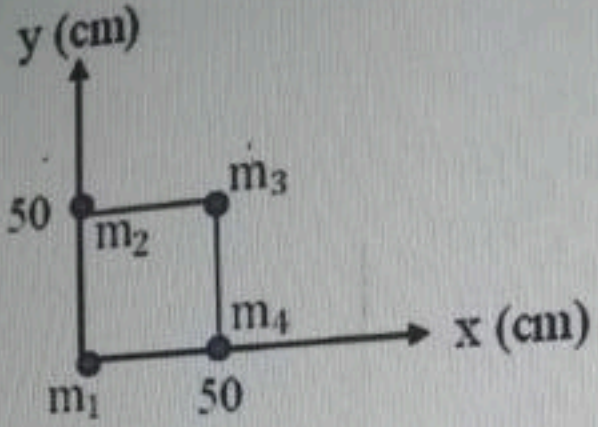
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Question 10

Not yet answered

Flag question

Four masses are placed on the corners of a square on x-y plane as shown in figure below, where $m_1 = m_2 = 200$ g and $m_3 = m_4 = 500$ g.



Where is the center of mass (x_{cm}, y_{cm}) of the system?

- A. (25, 37.14) cm
- B. (25, 25) cm
- C. (37.14, 50) cm
- D. (35.71, 25) cm

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Question 11

Not yet answered

Flag question

A light ray passes from a layer of benzene of refractive index (n = 1.50) to water of refractive index (n = 1.33). If the angle of incidence is 37°, what will be the angle of refraction?

- A. $\sin^{-1}(0.90)$
- B. $\sin^{-1}(0.80)$
- C. $\sin^{-1}(0.53)$
- D. $\sin^{-1}(0.68)$

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Question 12

Not yet answered

Flag question

Consider a car performing a motion with constant acceleration (a) starting from position x_0 at time $t = 0$ with initial velocity v_0. If v and x stand for velocity and position at time t, which one of the following equations correctly govern the motion of the car?

A. $x = -x_0 + \frac{2(v + v_0)}{t}$

B. $x = x_0 + \left(\frac{v + v_0}{2}\right)t$

C. $x = x_0 + \frac{v^2 + v_0^2}{2a}$

D. $x = x_0 + \left(\frac{v - v_0}{2}\right)t$

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Question 13

Not yet answered

Flag question

Ethiopian Physical Society is established by interested Ethiopian physics professionals to

A. prepare physics curriculum under the ministry of education directives.

B. contribute its own share to promote physics education and research.

C. take part in election and participate in government formation.

D. monitor and supervise the curriculum implementation in Ethiopian high schools.

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Question 14

Not yet answered

Flag question

If an arrow is drawn to a scale to describe a given vector, then its

A. length corresponds to the vector magnitude.

B. tail stands for the terminal point of the vector.

C. length corresponds to the vector direction.

D. head represents the initial point of the vector.

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Back

Question 15

Not yet answered

Flag question

From the given lists of machines, which one contains only simple machines?

- A. Gas-cylinder, Wedge, Screw, Lever
- B. Compound pulley, Wheel and axle, Seat belt, Inclined plane
- C. Washing machine, Car engine, Wedge, Lever
- D. Inclined plane, Screw, Wheel and axle, Wedge

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Question 16

Not yet answered

Flag question

The magnetic field created by current carrying wire at a point from the wire will

A. increase exponentially with the increase in the magnitude of the current.

B. decrease linearly with the increase in the magnitude of the current.

C. decrease exponentially with the increase in the magnitude of the current.

D. increase linearly with the increase in the magnitude of the current.

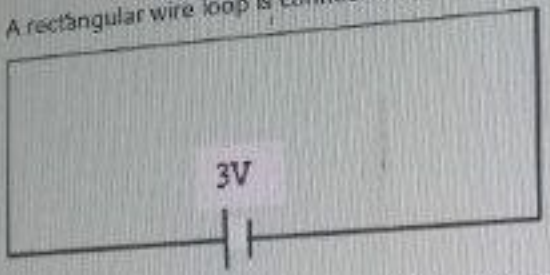
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Question 17

Not yet answered

Flag question

A rectangular wire loop is connected to a 3 V battery as shown below.



What will happen to the direction of the magnetic field inside the loop if the terminals of the battery are reversed?

- A. It will change from into the plane to out of the plane.
- B. It will change from out of the plane to into the plane.
- C. It will change from counterclockwise to clockwise.
- D. It will change from clockwise to counterclockwise.

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Question 18

Not yet answered

Flag question

A traveling wave has a speed v, wavelength λ, period T and frequency f. Which equation correctly states the wave equation?

- A. $v = \lambda T$
- B. $f = 1/(\lambda v)$
- C. $v = \lambda f$
- D. $T = 1/(\lambda f)$

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Question 19

Not yet answered

Flag question

The iodine isotope ^{131}I which has an eight-day half-life, is used in nuclear medicine. What is the decay constant of the isotope? (ln 2 = 0.693)

- A. 5.64 / day
- B. 8.66×10^{-2} / day
- C. 1.17×10^{-2} / day
- D. 12.5 / day

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Question 20

Not yet answered

Flag question

The velocity of car B with respect to a passenger in car A is 80 km/hr towards West. If the velocity of car A with respect to the ground is 30 km/hr towards East, what would be the velocity of car B with respect to the ground?

- A. 50 km/hr towards West
- B. 50 km/hr towards East
- C. 110 km/hr towards East
- D. 110 km/hr towards West

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Question 21

Not yet answered

Flag question

Which one of the following statements correctly describes the rotation of an object around a fixed axis?

A. Angular acceleration is perpendicular to the plane of rotation and in the same direction to angular velocity if the rotation rate is increasing.

B. Particles in the object that are closer to the axis will have different angular displacement from particles that are far from it.

C. Particles in the object closer to the axis will have larger angular velocity than particles that are farther from the axis.

D. Particles that are closer to the axis will have similar translational displacement from particles that are far from it.

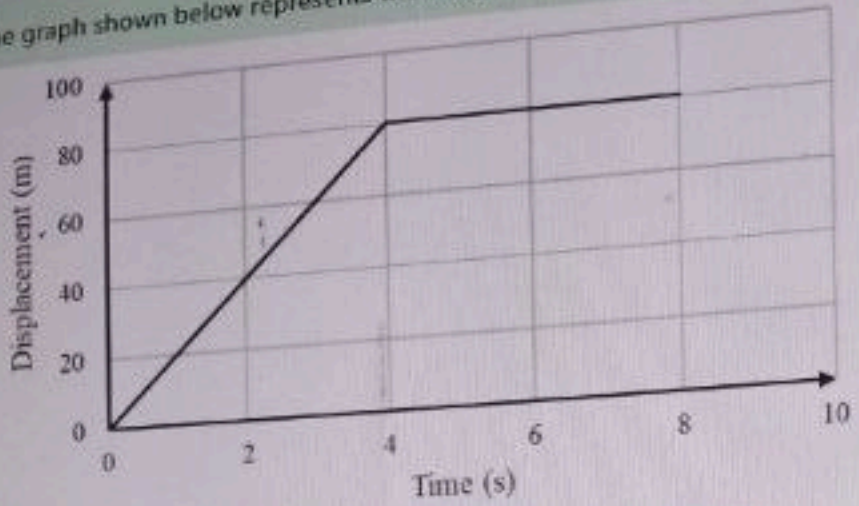
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Question 22

Not yet answered

Flag question

The graph shown below represents the motion of a car along a straight line.



What are the magnitudes of the velocities of the car for the first 4 seconds and the last 4 seconds, respectively?

- A. 0 m/s and 20 m/s
- B. 20 m/s and 0 m/s
- C. 20 m/s and 20 m/s
- D. 10 m/s and 0 m/s

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Question 23

Not yet answered

Flag question

Which one of the following sets contains only primary colors?

A. {red, blue, orange}

B. {blue, green, red}

C. {green, blue, black}

D. {red, green, yellow}

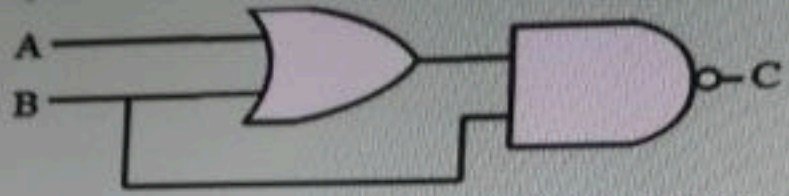
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Question 24

Not yet answered

Flag question

The logic circuit shown below consists of OR and NAND gates.



Which of the following tables represent the correct truth table for the circuit?

A.

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

B.

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

C.

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

D.

A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

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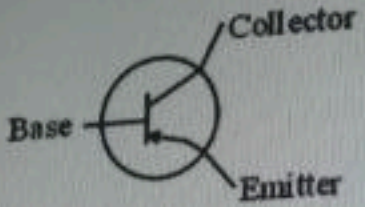
Question 25

Not yet answered

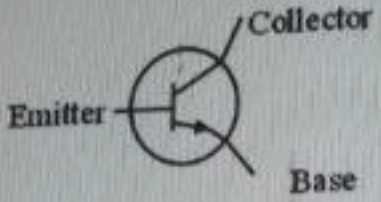
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Which of the following is a correct schematic symbol for an NPN transistors with its labelled terminals?

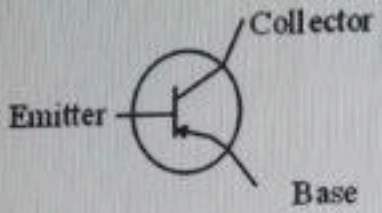
A.



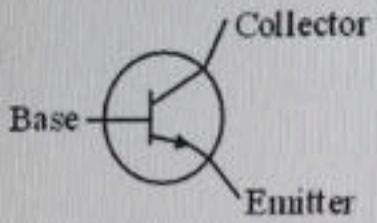
B.



C.



D.



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Question 26

Not yet answered

Flag question

A water hose of diameter 4 cm is connected to a tap of diameter 6 cm. The water flow rate from the tap is 1.57 $\times 10^{-4}$ m^3/s. What will be the speed of the water in the hose?

- A. 0.125 m/s
- B. 0.393 m/s
- C. 0.174 m/s
- D. 0.560 m/s

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Question 27

Not yet answered

Flag question

Suppose you want to check, without any touch, if there is a current flowing through a wire or not. Which one of the following devices is used?

- A. Test light
- B. Voltmeter
- C. Compass
- D. Ohmmeter

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Question 28

Not yet answered

Flag question

Which one of the following statements describes the characteristics of third order lever?

- A. The load is between the effort and fulcrum.
- B. The fulcrum is between the load and the effort.
- C. The effort distance is greater than load distance.
- D. The effort is between the load and the fulcrum.

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Question 29

Not yet answered

Flag question

Which one of the following statements correctly describes the characteristics of equipotential lines?

A. For point charge, the equipotential lines are straight lines and parallel to each other.

B. For uniform electric field, the equipotential lines are parallel to that of the field lines.

C. Electric potential difference is non-zero between two points on different equipotential lines.

D. Electric potential difference is non-zero between two points on the same equipotential line.

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Question 30

Not yet answered

Flag question

A strong nuclear force is

- A. an attractive force between the nucleus and the electrons around the nucleus.
- B. a short-range attractive force that acts between nucleons in the nucleus.
- C. a short-range repulsive force that acts between protons in the nucleus.
- D. a short-range force which acts inside the individual nucleons, and can split a neutron into proton and electron.

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Question 31

Not yet answered

Flag question

A 200 g piece of ice at 0 °C is placed in a certain amount of water at 20 °C. This system is in a container of negligible heat capacity and is insulated from its surroundings. How much should be the minimum mass of water to melt all the ice at 0 °C temperature? (The latent heat of fusion of ice is $L_f = 3.33 \times 10^5$ J/kg)

- A. 666 g
- B. 200 g
- C. 400 g
- D. 793 g

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Question 32

Not yet answered

Flag question

Consider two objects A and B, that A has twice the mass of B. If object B is raised to a height, h, above the ground and object A is raised to a height h/2, which of the following is correct about their gravitational potential energies? The gravitational potential energy of

- A. A is equal to that of B.
- B. A is twice that of B.
- C. B is twice that of A.
- D. A is 4 times that of B.

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Question 33

Not yet answered

Flag question

A quantity that describes deformation of materials that is given by fractional change in length or volume is

- A. stress.
- B. strain.
- C. elasticity.
- D. density.

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Question 34

Not yet answered

Flag question

Conservative force differs from the nonconservative one in that, the work done by

A. conservative force along a closed path is non-zero unlike that by non-conservative force.

B. conservative force is path independent unlike that by non-conservative one.

C. non-conservative force is path independent unlike that by the conservative one.

D. non-conservative force along a closed path is zero unlike that by non- conservative force.

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Question 35

Not yet answered

Flag question

Starting from rest, a car accelerates uniformly for 400 m, then continues for 600 m with constant velocity. It then decelerates uniformly with 1 m/s^2 until it stops after traveling for 200 m. What is the average velocity for the total trip?

- A. 20.0 m/s
- B. 6.5 m/s
- C. 13.3 m/s
- D. 10.0 m/s

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Question 36

Not yet answered

Flag question

If a student walks 100 m due 37° North of East and then 120 m towards South, what is the displacement moved by the student?

- A. 220 m, 53° North of East
- B. 100 m, 53° North of East
- C. 220 m, 37° South of East
- D. 100 m, 37° South of East

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Question 37

Not yet answered

Flag question

To determine the specific heat capacity of a solid we can use a method called

A. mixture method with heat energy supplied to the solid for a known time by an electrical heater of known power.

B. electrical method with the heat energy supplied for a known time by an electrical heater of known power.

C. electrical method with heat energy supplied to the solid by mixing a hot water and solid in a calorimeter.

D. mixture method with the heat energy supplied to the solid for unknown time by an electrical heater of known power.

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Items

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Finish attempt ...

Question 38

A compound pulley system consisting of two moveable and two fixed pulleys is used to lift a 400 N object as shown in the figure below.



If the frictional force between the pulleys and the rope is negligible, what is the mechanical advantage of the pulley system?

- A. 4
- B. 2
- C. 5
- D. 1

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Next page

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Question 39

Not yet answered

Flag question

The upward force that an object immersed in a fluid experience is known as

- A. weight of the object.
- B. turbulent force.
- C. buoyant force.
- D. force of the fluid.

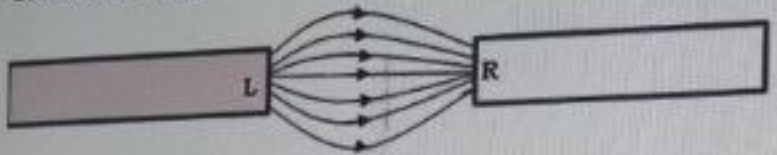
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Question 40

Not yet answered

Flag question

Consider the magnetic field lines between two bar magnets are partially drawn as shown in figure below.



The two poles of the magnets indicated by R and L 'respectively' are

- A. North and South poles.
- B. North and North poles.
- C. South and North poles.
- D. South and South poles.

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Question 41

Not yet answered

Flag question

Which one of the following statements describes heat?

- A. It is the form of energy that transfers when two objects of different temperatures are brought in thermal contact.
- B. It is the form of energy which is stored in an object and increases when the object's temperature increases.
- C. It is a property of a physical system which is related to the average kinetic energy of the particles of the system.
- D. It is a form of energy that transfers between two systems by doing work in the process to achieve mechanical equilibrium.

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Question 42

Not yet answered

Flag question

A current of 6 A flows in hot plate when the potential difference between the terminals of a hot plate is 102 V. How much current will flow if the potential difference is reduced to 68 V for a plate that obeys Ohm's law?

- A. 2 A
- B. 4 A
- C. 6 A
- D. 3.4 A

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Question 43

Not yet answered

Flag question

Which one of the following statements correctly describes a uniform circular motion of a particle in a horizontal plane? Its

- A. centripetal acceleration is a non-zero constant.
- B. tangential velocity is a non-zero constant.
- C. angular velocity is a non-zero constant.
- D. tangential acceleration is a non-zero constant.

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Question 44

Not yet answered

Flag question

Electric field at a point is defined as the electric

A. force per unit mass that a test charge experiences when placed at that point.

B. force that a positive test charge exerts on another point charge placed at that point.

C. potential energy per unit charge of a test charge placed at that point.

D. force per unit charge that a positive test charge experiences when placed at that point.

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Question 45

Not yet answered

Flag question

When an n-type and p-type semiconductors form a junction, it will form a diode

A. that conducts significant current in both forward and reverse biasing.

B. that will have an ohmic type current-voltage characteristics.

C. where a p-side is anode and the n-side is cathode at the junction.

D. that conducts current in the reverse biasing but not in the forward biasing.

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Question 46

Not yet answered

Flag question

A car is moving with a constant acceleration. This means that

- A. its velocity changes equally with equal interval of time.
- B. it moves with constant speed.
- C. it moves with constant velocity.
- D. its position changes equally with equal interval of time.

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Question 47

Not yet answered

Flag question

A packed books of mass 3 kg is lying on the surface of a 0.90 m high table. If you pick it up and place it on a bookshelf 2.0 m above the floor, the work done by you and by the gravity, respectively, are

- A. -60 J and 60 J
- B. 33 J and -33 J
- C. -33 J and 33 J
- D. 60 J and -60 J

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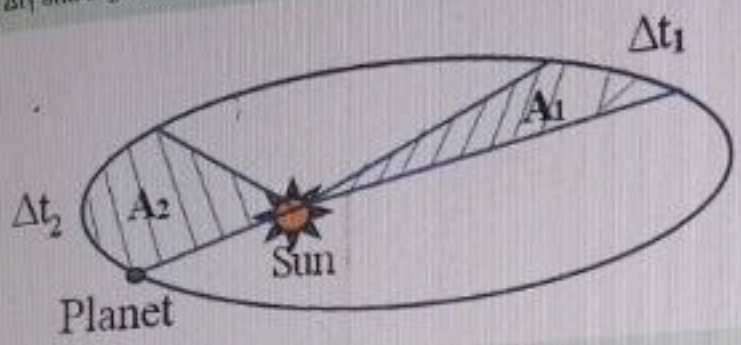
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Question 48

Not yet answered

Flag question

A certain planet revolving around the sun sweeps areas A_1 and A_2 at different positions during the time interval of Δt_1 and Δt_2, respectively as shown in the figure below.



Which one of the following correctly states Kepler's second law of planetary motion?

- A. If $\Delta t_1 > \Delta t_2$, then $A_1 = A_2$
- B. If $\Delta t_1 = \Delta t_2$, then $A_1 = A_2$
- C. If $\Delta t_1 > \Delta t_2$, then $A_1 < A_2$
- D. If $\Delta t_1 = 2\Delta t_2$, then $A_1 = (A_2)^2$

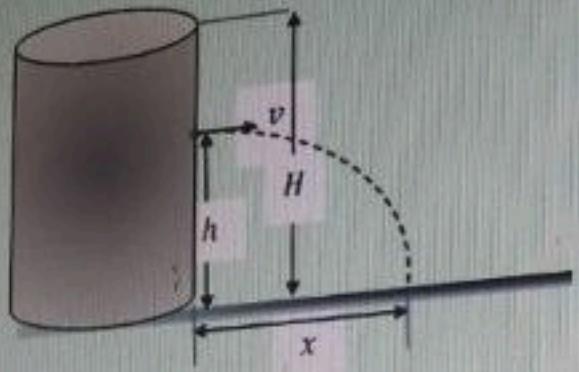
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Question 49

Not yet answered

Flag question

A barrel of height H is fully filled with water. A bullet shot the barrel at height h above the ground and the water is projected at a horizontal speed of v as shown in the figure below.



At what horizontal distance (x) does the spilled water strikes the ground?

A. $x = v\sqrt{\frac{2(H-h)}{g}}$

B. $x = v\sqrt{g}$

C. $x = v\sqrt{\frac{g}{H}}$

D. $x = v\sqrt{\frac{2h}{g}}$

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Question 50

Not yet answered

Flag question

For an athlete who runs on a track for a specified time interval, her distance and displacement can be different in that distance

- A. can be negative whereas displacement cannot be.
- B. is less than the magnitude of displacement.
- C. can be zero whereas the displacement cannot be.
- D. is greater than the magnitude of displacement.

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Question 51

Not yet answered

Flag question

A collision between two particles is known as

- A. elastic if the total kinetic energy is not conserved but the total momentum is conserved.
- B. elastic if both the total kinetic energy and momentum are conserved.
- C. inelastic if the total kinetic energy is conserved but the total momentum is not conserved.
- D. inelastic if both the total kinetic energy and momentum are conserved.

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Question 52

Not yet answered

Flag question

Which one of the following statements does **NOT** explain the contribution of technology to advancement of physics correctly?

- A. The invention of space shuttles enabled experiments in space.
- B. The development of light detectors enabled spectral analysis.
- C. The invention of x-rays enabled proper medical imaging.
- D. The development of x-rays enabled study of atomic structure.

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Question 53

Not yet answered

Flag question

For a person with defects of vision known as hypermetropia.

- A. close objects cannot be clearly seen, so the defect can be corrected by concave lenses.
- B. far objects cannot be clearly seen, so the defect can be corrected by convex lenses.
- C. far objects cannot be clearly seen, so the defect can be corrected by concave lenses.
- D. close objects cannot be clearly seen, so the defect can be corrected by convex lenses.

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Question 54

Not yet answered

Flag question

A parallel-plate capacitor has square metallic plates each of area 100 cm^2 separated by 1 mm. The space between the plates is filled by a dielectric of dielectric constant k = 4. If the plates are connected to the terminals of 12 V battery, how much charge is stored on the capacitor?

- A. 360 nC
- B. 4.25 nC
- C. 43.2 nC
- D. 1.08 nC

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Physics

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Question 55

Not yet answered

Flag question

Two spheres A and B are initially neutral. If sphere A is charged by conduction and sphere B is charged by induction, using identical negatively charged rods, which one of the following is correct about the charge of the two spheres after charging?

- A. Both spheres end up negatively charged.
- B. Both spheres end up positively charged.
- C. Sphere A ends up positively charged.
- D. Sphere B ends up positively charged.

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Exam n

Some

Items

1 2 10 11 19 20 28 29 37 38 46 47 55 56

Finish attemp

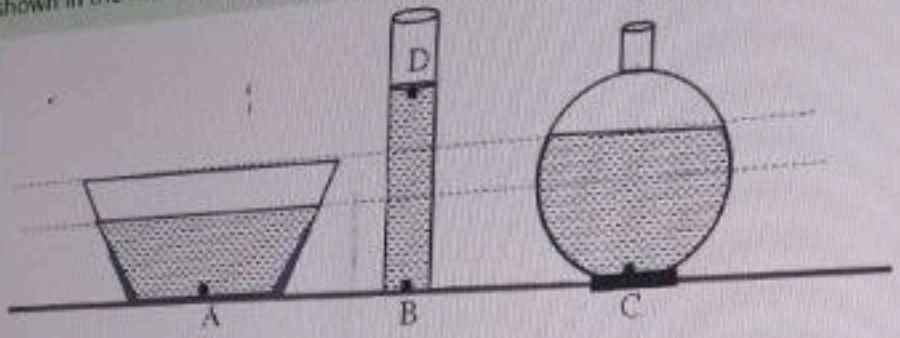
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Question 56

Not yet answered

Flag question

Three different shapes of containers are filled with water at different levels and opened to the atmosphere as shown in the following figure.



At which point does a student measure the highest pressure?

- A. At point B
- B. At point C
- C. At point D
- D. At point A

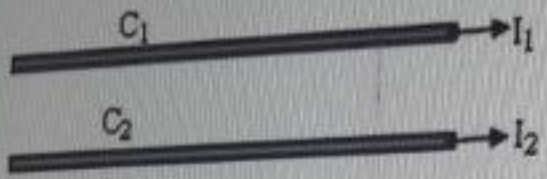
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Question 57

Not yet answered

Flag question

Given two parallel conductors C_1 and C_2 carrying currents in the same direction as shown in the figure below.



The force between the two conductors is attractive because the

- A. magnitude of magnetic field produced by I_1 at C_2 is the same as that produced by I_2 at C_1.
- B. direction of magnetic field produced by I_1 at C_2 is opposite to that produced by I_2 at C_1.
- C. magnitude of magnetic field produced by I_1 at C_2 is different from that produced by I_2 at C_1.
- D. direction of magnetic field produced by I_1 at C_2 is the same as that produced by I_2 at C_1.

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Question 58

Not yet answered

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A square wire loop with a side length 12 cm is placed in such a way that its area vector makes an angle of 60^{o} with the magnetic field of 10 T. If the loop is slowly pulled out of the magnetic field in 6 s, how much electromotive force is induced in the loop during this time?

- A. 24 mV
- B. 17.2 mV
- C. 12 mV
- D. 20.9 mV

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Question 59

Not yet answered

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Lenses form images by refraction of light rays from the object such that the position, size, and nature of the image is determined from a point where the refracted rays or their extensions meet. After refraction from lens, a light ray

- A. through the optical center will emerge parallel to the principal axis.
- B. through the principal focus will emerge parallel to the principal axis.
- C. parallel to the principal axis will emerge without any deviation.
- D. parallel to the principal axis will emerge through the optical center.

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Question 60

Not yet answered

Flag question

Co-planar vectors are vectors which are

- A. lying in the same plane.
- B. perpendicular and lying in two parallel planes.
- C. parallel and lying in two parallel planes.
- D. lying in different planes.

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