1402

آکادمی بین‌المللی دان

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Question 1

Wrong answer

Score -25.00 out of 100.00

During a thermodynamic cycle, an ideal thermal machine absorbs heat $Q_2 > 0$ from a hot source and uses it to perform a job $L > 0$, transferring heat $Q_1 < 0$ to a cold source , with a yield of 20%. How much is the work done in relation to Q_1 worth ?

(a) $L = 0$

(b) $L + Q_1 /5$

(c) $L = Q_1 /4$ ✗

(d) $L = - Q_1 /5$

(e) $L = - Q_1 /4$

Wrong answer.

The correct answer is: $L = - Q_1 /4$

Question 2

Correct answer

Score 100.00 out of 100.00

A copper wire has a section equal to 1.67 mm^2 and length L = 50 cm. The resistivity of copper at room temperature is $1.67\ 10^{-8}$ Ωm. Determine the resistance R measured at the ends.

(a) $R = 5.6 \cdot 10^{-1}$ Ω

(b) $R = 5.0 \cdot 10^{-9}$ Ω

(c) $R = 5.0 \cdot 10^{-5}$ Ω

(d) $R = 5.0 \cdot 10^{-3}$ Ω ✓

(e) $R = 5.6 \cdot 10^{-8}$ Ω

Correct answer.

The correct answer is: $R = 5.0 \cdot 10^{-3}$ Ω

Question 3

Wrong answer

Score -25.00 out of 100.00

An object moves in a uniformly accelerated rectilinear motion with acceleration a for a time $t = 5\,s$, covering a distance $d = 8\,m$. If its initial velocity is $v_0 = 2\,m/s$, which of the following statements is correct?

- (A) a has the same verse as v_0, $v_f = 0$
- (B) a has opposite verse v_0, $v_f = 0$
- (C) a has opposite verse v_0; the final speed v_f has the same direction as v_0
- (D) a has the same direction of v_0, v_f opposite
- (E) a and v_f have the same verse of v_0 ✗

The correct answer is: a has opposite verse v_0; the final speed v_f has the same direction as v_0

Question 4

Wrong answer

Score -25.00 out of 100.00

What is the value of the Earth's average rate ?

- (to) $6.38 \cdot 10^{9}$ km
- (B) $6.38 \cdot 10^{10}$ km ✗
- (C) $6.38 \cdot 10^{5}$ m
- (D) $6.38 \cdot 10^{3}$ km
- (e) $6.38 \cdot 10$ km

Wrong answer.

The correct answer is: $6.38 \cdot 10^{3}$ km

Question 5

Correct answer

Score 100.00 out of 100.00

The surface of a conductive sphere is uniformly charged with a charge q. The electrostatic field at a point P located outside the sphere

- (a) is inversely proportional to the square of the distance of the point P from the center of the sphere ✓
- (b) is inversely proportional to the square of the distance of the point P from the surface of the sphere
- (c) is inversely proportional to the distance of the point P from the center of the sphere
- (d) is always null
- (e) is inversely proportional to the distance of the point P from the surface of the sphere

Correct answer.

The correct answer is: it is inversely proportional to the square of the distance of the point P from the center of the sphere

Question 6

Correct answer

Score 100.00 out of 100.00

An elastic constant spring $K = 200$ N / m has one end fixed to the ceiling while a body of mass M is fixed to the other end. At equilibrium, the spring is elongated by $X = 25$ cm with respect to its rest length. What is the mass of the body? (Approximate acceleration of gravity of 10 m / s^2)

- (a) $M = 20$ kg
- (b) $M = 50$ kg
- (c) $M = 5$ kg ✓
- (d) $M = 0.5$ kg
- (e) $M = 2$ kg

Correct answer.

The correct answer is: $M = 5$ kg

Question 7

Correct answer

Score 100.00 out of 100.00

A ball is thrown upwards. Which of the following statements is false?

- (a) The kinetic energy of the ball decreases as it rises.
- (b) The potential energy of the ball increases as it rises.
- (c) The kinetic energy of the ball is a function of its speed.
- (d) As the ball rises, the force of gravity does positive work on it. ✓
- (e) As the ball rises, the force of gravity opposes the motion.

Correct answer.

The correct answer is: As the ball goes up, the force of gravity does positive work on it.

Question 8

Correct answer

Score 100.00 out of 100.00

A body of mass m , subjected to the action of a force F , moves with acceleration equal to a . If, keeping the force constant, we halve the mass m , the acceleration of the system:

- (a) remains constant
- (b) nothing can be said about the acceleration of the system because it depends on the value of m
- (c) is halved
- (d) doubles ✓
- (e) nothing can be said about the acceleration of the system because it depends on the value of F

Correct answer.

The correct answer is: double

Question 9

Wrong answer

Score -25.00 out of 100.00

A car travels at a speed of 10 m / s along a 1 km radius curve. How much is its centripetal acceleration?

- (to) $100\ m/s^2$
- (B) $10\ m/s^2$ ✗
- (C) $1\ m/s^2$
- (d) It is not possible to calculate it if you do not know the time taken to travel the curve
- (is) $0.1\ m/s^2$

Wrong answer.

The correct answer is: $0.1\ m/s^2$

Question 10

Correct answer

Score 100.00 out of 100.00

A copper block of mass $m_{cu} = 20$ g is found in the laboratory at an initial temperature t_{in}. At block there is provided a heat equal to $Q = 84$ J thanks to which reaches the final temperature $T_{fin} = 35\ ^\circ C$. Knowing that the specific heat c_{cu} of the copper can be approximated to 0.1 cal / g ° C and using the approximation 1 cal = 4.2 J, determine the value of the initial temperature t_{in}.

- (a) none of the other answers are correct
- (b) 25 ° C ✓
- (c) 250 ° C
- (d) 390 K
- (e) 2.5 ° C

Correct answer.

The correct answer is: 25 ° C

Question 11

Wrong answer

Score -25.00 out of 100.00

What is the minimum volume that a body with a mass of 1 kg must have in order not to sink when immersed in water? (water density = 10 kg / m^3).

- (a) none of the other answers are correct ✗
- (b) 1000 cm^3
- (c) $1 \cdot 10^{-3}$ m^3
- (d) 2 dm^3
- (e) 0.210 m^3

Wrong answer.

The correct answer is: $1 \cdot 10^{-3}$ m^3

Question 12

Wrong answer

Score -25.00 out of 100.00

Two arbitrary $\vec{a}$ and $\vec{b}$ planar vectors of forms a and are given b. Let it be $\vec{c} = \vec{a} + \vec{b}$. The form of $\vec{c}$:

- (A) is always greater than $a + b$.
- (B) is always less than $a + b$.
- (C) is greater than or equal to $a + b$. ✗
- (D) is always equal to $a + b$.
- (E) is less than or equal to $a + b$.

The correct answer is: it is less than or equal to $a + b$.

Training test

Started	Thursday, March 12 2020, 3:09 pm
State	Completed
terminated	Thursday, March 12 2020, 3:31 pm
The time spent on	21 min 50 seconds
Score	750,00 / 1200,00
Rating	**7.50 out** of a maximum of 12.00 (**63** %)

Question 1

Wrong answer

Score -25.00 out of 100.00

According to Stevin's law, if the depth inside a liquid in static equilibrium increases

- (a) the hydrostatic pressure increases
- (b) the acceleration of gravity increases
- (c) the hydrostatic pressure decreases
- (d) the hydrostatic pressure remains unchanged ✗
- (e) Stevin's law does not apply to liquids in static balance

Wrong answer.

The correct answer is: hydrostatic pressure increases

Question 2

Answer not given

Max score: 100.00

If the dimensions of mass, length and time are indicated with [M], [L] and [T] respectively, the dimensions of the tangential acceleration are:

- (a) $[L]\,[T]^{-2}$
- (b) $[M]_2[L]\,[T]$
- (c) $[L]\quad[T]_{-2}$
- (d) $[L]\,[T]_{-2}^{-2}$
- (e) $[L]\quad[T]$

Wrong answer.

The correct answer is: $[L]\,[T]^{-2}$

Question 3

Correct answer

Score 100.00 out of 100.00

A container with rigid and hermetically sealed walls contains a perfect gas at temperature T_1 = 300 K and pressure p_1 = 1 Pa. At what pressure does the gas go if the container is cooled down to a temperature of T_2 = 270 K?

- (a) 0.9 Pa ✓
- (b) 11.1 Pa
- (c) 1.11 Pa
- (d) The pressure does not vary
- (e) 0.09 Pa

Correct answer.

The correct answer is: 0.9 Pa

Question 4

Correct answer

Score 100.00 out of 100.00

A body moves with uniform circular motion on a circumference of radius $R = 0.2\text{m}$. Its speed module is $v = 2\text{m}/\text{s}$. How much is its angular velocity worth ω?

- (A) 10 rad / s ✓
- (B) 2π rad / s
- (C) 1 rad / s
- (D) 4πrad / s
- (E) $0,4$rad / s

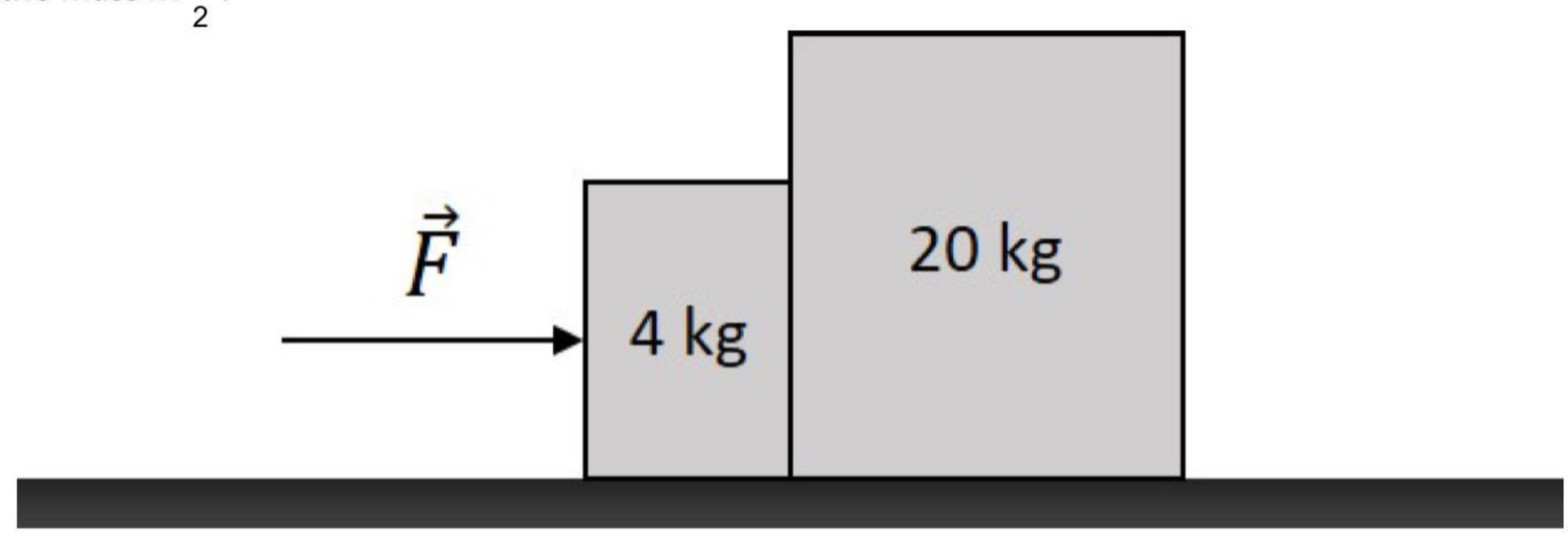
The correct answer is: 10 rad / s

Question 5

Wrong answer

Score -25.00 out of 100.00

Two boxes of mass m_1 = 4 kg and m_2 = 20 kg are placed on a smooth surface. The force F = 12 N is applied to the mass m_1 (see figure). How much is the force F_{12} that the mass m_1 exerts on the mass m_2 ?



(a) F_{12} = 4 N

(b) F_{12} = 72 N

(c) F_{12} = 12 N ✗

(d) F_{12} = 2 N

(e) F_{12} = 10 N

Wrong answer.

The correct answer is: F_{12} = 10 N

Question 6

Correct answer

Score 100.00 out of 100.00

The surface of a conductive sphere is uniformly charged with a charge q. The electrostatic field at a point P located outside the sphere

(a) is inversely proportional to the distance of the point P from the center of the sphere

(b) is inversely proportional to the square of the distance of point P from the center of the sphere ✓

(c) is always null

(d) is inversely proportional to the square of the distance of point P from the surface of the sphere

(e) is inversely proportional to the distance of the point P from the surface of the sphere

Correct answer.

The correct answer is: it is inversely proportional to the square of the distance of the point P from the center of the sphere

Question 7

Correct answer

Score 100.00 out of 100.00

Two arbitrary $\vec{a}$ and $\vec{b}$ planar vectors of forms a and are given b. Let it be $\vec{c} = \vec{a} + \vec{b}$. The form of $\vec{c}$:

- (A) is always equal to $a + b$.
- (B) is less than or equal to $a + b$. ✓
- (C) is always less than $a + b$.
- (D) is greater than or equal to $a + b$.
- (E) is always greater than $a + b$.

The correct answer is: it is less than or equal to $a + b$.

Question 8

Correct answer

Score 100.00 out of 100.00

After exercising, a cyclist lost 460 kcal of heat from evaporation of water from the skin. Approximating the latent heat of evaporation of the water to J / kg and knowing that 1kcal = 4180 J, how much water is lost $2,3 \times 10^6$?

- (a) 83.6 g
- (b) 83.6 kg
- (c) 8.36 kg
- (d) 836 g ✓
- (e) 8.36 g

Correct answer.

The correct answer is: 836 g

Question 9

Correct answer

Score 100.00 out of 100.00

A car moves in a $_2$straight direction, starting from a standstill, with constant acceleration equal to $10m / s$. What will be your speed after covering 45m?

- (a) 40m / s
- (b) 5m / s
- (c) 20m / s
- (d) 50m / s
- (e) 30m / s ✓

Correct answer.

The correct answer is: 30m / s

Question 10

Correct answer

Score 100.00 out of 100.00

A ball is thrown upwards. Which of the following statements is false?

- (a) As the ball rises, the force of gravity opposes the motion.
- (b) The potential energy of the ball increases as it rises.
- (c) As the ball rises, the force of gravity does positive work on it. ✓
- (d) The kinetic energy of the ball is a function of its speed.
- (e) The kinetic energy of the ball decreases as it rises.

Correct answer.

The correct answer is: As the ball goes up, the force of gravity does positive work on it.

Question 11

Correct answer

Score 100.00 out of 100.00

A trolley of mass $M = 25$ kg is moved along a horizontal plane without friction with an acceleration parallel to the plane of $8\ m/s^2$. What is the value of the force that is applied to the trolley, knowing that it forms a $60°$ angle with the plane?

- (a) $F = 2000$ N
- (b) $F = 200$ N
- (c) $F = 4000$ N
- (d) $F = 40$ N
- (e) $F = 400$ N ✓

Correct answer.

The correct answer is: $F = 400$ N

Question 12

Answer not given

Max score: 100.00

Calculate the value of the current intensity I flowing in a conductor where the drift velocity of the charge carriers (electrons) is $v_d = 2 \cdot 10^{-4}$ m / s and the circular section is $S = 5\ mm^2$. [Assume that the density of carriers is equal to $5 = 10^{28}\ m^{-3}$].

- (a) $I = 0.8$ A
- (b) $I = 0.08$ A
- (c) $I = 2$ A
- (d) $I = 8$ A
- (e) $I = 16$ A

Wrong answer.

The correct answer is: $I = 8$ A

Training test

Started	Sunday, March 15 2020, 5:10 pm
State	Completed
terminated	Sunday, March 15 2020, 5:35 pm
The time spent on	25 min 11 seconds
Score	575,00 / 1200,00
Rating	**5.75 out** of a maximum of 12.00 (**48** %)

Question 1

Correct answer

Score 100.00 out of 100.00

An object moves in a uniformly accelerated rectilinear motion with acceleration a for a time $t = 5\,s$, covering a distance $d = 8\,m$. If its initial velocity is $v_0 = 2\,m/s$, which of the following statements is correct?

- (A) a has the same verse as v_0, $v_f = 0$
- (B) a has the same direction of v_0, v_f opposite
- (C) a has opposite verse v_0, $v_f = 0$
- (D) a has opposite verse v_0; the final speed v_f has the same direction as v_0 ✓
- (E) a and v_f have the same verse of v_0

The correct answer is: a has opposite verse v_0; the final speed v_f has the same direction as v_0

Question 2

Correct answer

Score 100.00 out of 100.00

2 vectors are given and in the plane, of modules $|\vec{a}|$ $|\vec{b}|$ $|\vec{a}|$ = 5 and $|\vec{b}|$ = 5. How much is the modulus of their vector difference = - knowing that the angle between the vectors and $\vec{d}$ $\vec{a}$ $\vec{b}$ $\vec{a}$ $\vec{b}$ is it 60 °?

- (a) none of the other answers are correct
- (b) 15
- (c) 50
- (d) 5 ✓
- (e) 25

Correct answer.

The correct answer is: 5

Question 3

Correct answer

Score 100.00 out of 100.00

A centrifuge used to train astronauts rotates at a constant angular speed of 2 rad / s. Internally, the staff in training bears a centripetal acceleration equal to 4 times that due to gravity. How long is the centrifuge arm? Consider g = 10 m / s

(a) 10 m ✓

(b) 2.5 m

(c) It cannot be calculated if the mass of the centrifuge is unknown

(d) 1 m

(e) 20 m

Correct answer.

The correct answer is: 10 m

Question 4

Wrong answer

Score -25.00 out of 100.00

The elastic forces of two springs, elongated by x_1 and x_2 respectively, have the same intensity. If $\frac{x_1}{x_2} = \frac{2}{3}$, how much is the ratio $\frac{k_1}{k_2}$ of elastic constants?

(A) 1/2

(B) 2/3 ✗

(C) 1/4

(D) 3/2

(E) 4/3

The correct answer is: 3/2

Question 5

Correct answer

Score 100.00 out of 100.00

Two tungsten wires have the same mass. Wire A is as long as wire B. Their resistances, R_A and R_B, are linked by

(a) $R_A = 2R_B$

(b) $R_A = R_B$ ✓

(c) $R_A = 10R_B$

(d) $R_B = 10R_A$

(e) $R_B = 2R_A$

Correct answer.

The correct answer is: $R_A = R_B$

Question 6

Correct answer

Score 100.00 out of 100.00

The efficiency of a thermal machine that completes a Carnot cycle is equal to 0.8. Knowing that it absorbs heat from a hot source that is at the temperature T_C = 1000 K, at what temperature T_F is a cold source?

- (a) 360 K
- (b) 200 K ✓
- (c) 400 K
- (d) 250 K
- (e) 800 K

Correct answer.

The correct answer is: 200K

Question 7

Correct answer

Score 100.00 out of 100.00

A copper block of mass m_{cu} = 20 g is found in the laboratory at an initial temperature t_{in}. At block there is provided a heat equal to Q = 84 J thanks to which reaches the final temperature T_{fin} = 35 ° C. Knowing that the specific heat c_{cu} of the copper can be approximated to 0.1 cal / g ° C and using the approximation 1 cal = 4.2 J, determine the value of the initial temperature t_{in}.

- (a) 390 K
- (b) none of the other answers are correct
- (c) 25 ° C ✓
- (d) 2.5 ° C
- (e) 250 ° C

Correct answer.

The correct answer is: 25 ° C

Question 8

Correct answer

Score 100.00 out of 100.00

A mass body m slides along a smooth plane inclined at an angle θ from the horizontal. What can be said about its acceleration?

- (A) which is parallel to the plane and is valid in module $g\cos\theta$
- (B) which is parallel to the plane and is valid in module g
- (C) which is parallel to the plane and is valid in module $g\sin\theta$ ✓
- (D) which is vertical, directed downwards and has modulus $g = 9.8\mathrm{m}/\mathrm{s}^2$
- (E) which has a component parallel to the plane and one perpendicular to the plane

The correct answer is: that it is parallel to the plane and is valid in form $g\sin\theta$

Question 9

Wrong answer

Score -25.00 out of 100.00

In the International System, a vector quantity is measured in $kg\ m^2/s^2$. What size could it be?

- (A) Entropy
- (B) Momentum ✗
- (C) Moment of momentum
- (D) Impulse of a force
- (E) Moment of a force

The correct answer is: Moment of a force

Question 10

Wrong answer

Score -25.00 out of 100.00

A liquid in stationary motion flows in a horizontal tube. If at a certain point in the tube its diameter increases, what effects can be observed on the flow of liquid?

- (a) In the absence of sufficient information on the pressure value, it is not possible to answer
- (b) In the section of pipe with a larger diameter, the speed of the liquid decreases and the flow rate remains constant
- (c) In the section of pipe with a larger diameter, the speed of the liquid increases and the flow rate remains constant
- (d) In the section of pipe with a larger diameter, the flow rate and speed of the liquid remain unchanged
- (e) In the section of pipe with a larger diameter, the flow rate decreases and the speed of the liquid increases ✗

Wrong answer.

The correct answer is: In the section of pipe with a larger diameter, the speed of the liquid decreases and the flow rate remains constant

Question 11

Wrong answer

Score -25.00 out of 100.00

A spherical surface contains three charges $q_1 = 4q$, $q_2 = 5q$, $q_3 = -7q$. A fourth charge $q_4 = -5q$ is placed outside the sphere. How much is the flow of the electric field through the spherical surface worth? Let ε_0 the dielectric constant of the vacuum.

- (a) $16q / \varepsilon_0$
- (b) $2q / \varepsilon_0$
- (c) $-3q / \varepsilon_0$
- (d) is null
- (e) it cannot be determined because the exact position of the charges within the spherical surface is unknown ✗

Wrong answer.

The correct answer is: $2q / \varepsilon_0$

Question 12

Wrong answer

Score -25.00 out of 100.00

To a point body of mass m = 1 kg, in motion with speed v = 20 m / s, a force is applied which decreases its speed up to 10 m / s. If no other forces act on the body, it can be said that:

- (a) the work of force is nil.
- (b) None of the other answers are correct ✗
- (c) Nothing can be said without knowing how long the force acts.
- (d) the work of the force is equal to –150 J.
- (e) the work of the force is equal to 150 J.

Wrong answer.

The correct answer is: the work of strength is equal to -150 J.

Training test

Started	Monday, March 16 2020, 10:18
State	Completed
terminated	Monday, March 16 2020, 10:43 am
The time spent on	24 mins 36 seconds
Score	750,00 / 1200,00
Rating	**7.50 out** of a maximum of 12.00 (**63** %)

Question 1

Wrong answer

Score -25.00 out of 100.00

Two vectors lying on the Cartesian plane (y, z), have the same module equal to 4 units. The first forms an angle equal to 25 ° with the y axis and the second forms an angle equal to 45 ° with the direction of the first vector. How much are the scalar and vector product of the first vector for the second? (indicate with $\hat{i}$, $\hat{j}$ and $\hat{k}$ the versors of the x, y and z axis, respectively)

(a) scale = 0; vector = $16\hat{k}$ ✗

(b) scale = 4 ; vector = $16\hat{j}$

(c) scale = 16; vector = $-16\hat{j}$

(d) scale = 0 ; vector = 0

(e) scalar = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$

Wrong answer.

The correct answer is: scalare = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$

Question 2

Correct answer

Score 100.00 out of 100.00

During a thermodynamic cycle, an ideal thermal machine absorbs heat $Q_2 > 0$ from a hot source and uses it to perform a job $L > 0$, transferring heat $Q_1 < 0$ to a cold source , with a yield of 20%. How much is the work done in relation to Q_1 worth ?

(a) $L = Q_1 /5$

(b) $L = Q_1 /4$

(c) $L = 0$

(d) $L = - Q_1 /5$

(e) $L = - Q_1 /4$ ✓

Correct answer.

The correct answer is: $L = - Q_1 /4$

Question 3

Correct answer

Score 100.00 out of 100.00

A point charge $q = 3 \cdot 10^{-6}$ C, having a mass of $4 \cdot 10^{-3}$ kg, placed in a uniform electric field is subject to an acceleration equal in modulus to $6 \cdot 10^{2}$ m / s^2 . How much is the electric field module worth?

(a) $0.125 \ V / m$

(b) $7.2 \cdot 10^{-11}$ V / m

(c) $8.0 \ V / m$ ✓

(d) $2.0 \cdot 10^{-6}$ V / m

(e) $4.5 \cdot 10^{-6}$ V / m

Correct answer.

The correct answer is: $8.0 \ V / m$

Question 4

Correct answer

Score 100.00 out of 100.00

The specific heat of a body is defined by the relationship $c = Q/(m \Delta T)$ where Q the heat exchanged by the body is, m the mass of the body and ΔT its variation in temperature. What is the specific heat unit of measurement in the International System?

(TO) $cal/(g\,K)$

(B) $J/(g\,^{\circ}C)$

(C) $cal/(g\,^{\circ}C)$

(D) $J/(kg\,K)$ ✓

(IS) $J/(g\,K)$

The correct answer is: $J/(kg\,K)$

Question 5

Wrong answer

Score -25.00 out of 100.00

A mass bucket M is lowered from above using a rope subjected to a module tension T. The acceleration of the bucket has modulus a and is turned downwards. Which of the following relationships is correct?

- (TO) $Mg + T + Ma = 0$
- (B) $T = M(g + a)$ ✗
- (C) $T = -M(g + a)$
- (D) $T = M(g - a)$
- (IS) $T = -M(g - a)$

The correct answer is: $T = M(g - a)$

Question 6

Correct answer

Score 100.00 out of 100.00

After exercising, a cyclist lost 460 kcal of heat from evaporation of water from the skin. Approximating the latent heat of evaporation of the water to J / kg and knowing that 1kcal = 4180 J, how much water is lost $2,3 \times 10^6$?

- (a) 836 g ✓
- (b) 8.36 kg
- (c) 83.6 kg
- (d) 83.6 g
- (e) 8.36 g

Correct answer.

The correct answer is: 836 g

Question 7

Answer not given

Max score: 100.00

Archimedes' thrust on a body completely immersed in a fluid only depends

- (a) the depth at which the body is located and the volume of fluid moved
- (b) from the depth at which the body is located and from its mass
- (c) the acceleration of gravity and the depth at which the body is located
- (d) the weight of the body and the density of the fluid
- (e) the volume of the body and the density of the fluid

Wrong answer.

The correct answer is: from the volume of the body and the density of the fluid

Question 8

Correct answer

Score 100.00 out of 100.00

A centrifuge used to train astronauts rotates at a constant angular speed of 2 rad / s. Internally, the staff in training bears a centripetal acceleration equal to 4 times that due to gravity. How long is the centrifuge arm? Consider g = 10 m / s

(a) 2.5 m

(b) 10 m ✓

(c) 1 m

(d) It cannot be calculated if the mass of the centrifuge is unknown

(e) 20 m

Correct answer.

The correct answer is: 10 m

Question 9

Correct answer

Score 100.00 out of 100.00

Two resistors R_1 and R_2 are connected in series. R_1 is the half of R_2 and a difference in potential is applied to the heads of the series V. Which of the following statements is wrong ?

(A) the equivalent resistance of the series is triple of R_1

(B) a current flows in the series $V/(3R_1)$

(C) a power is dissipated in the series $V^2/(3R_1)$

(D) the potential difference across the leads R_1 is double the potential difference across the leads R_2 ✓

(E) the same current flows in both resistances

The correct answer is: the potential difference across heads R_1 is double the potential difference across heads R_2

Question 10

Answer not given

Max score: 100.00

A motor with a maximum power of $9 \cdot 10^4$ W is used to operate a freight elevator that weighs $1.5 \cdot 10^4$ N when empty . What is the maximum weight of the load placed in the hoist that this motor can lift at an average speed of 3 m / s?

(a) $7.5 10^4$ N

(b) There is not enough data to respond.

(c) $1.5 10^4$ N

(d) None of the other answers are correct

(e) $45 10^4$ N

Wrong answer.

The correct answer is: $1.5 \cdot 10^4$ N

Question 11

Correct answer

Score 100.00 out of 100.00

A trolley of mass M = 25 kg is moved along a horizontal plane without friction with an acceleration parallel to the plane of 8 m / s^2. What is the value of the force that is applied to the trolley, knowing that it forms a 60 ° angle with the plane?

(a) F = 200 N

(b) F = 400 N ✓

(c) F = 40 N

(d) F = 2000 N

(e) F = 4000 N

Correct answer.

The correct answer is: F = 400 N

Question 12

Correct answer

Score 100.00 out of 100.00

A body initially stationary in the origin of the x axis is subjected to a constant acceleration equal to $2\ m/s^2$ for a time interval equal to $10\ s$. At the end of this interval, the previous acceleration is replaced by another, of opposite direction and of module equal to $1\ m/s^2$. How long does it take to return to the origin?

(A) does not return to the origin because the acceleration in the second part is lower in modulus than that of the first

(B) it is not possible to answer the question with the data provided

(C) less than 20 s after its departure from the origin

(D) after exactly 20 s from its departure from the origin

(E) after more than 20 s from its departure from the origin ✓

The correct answer is: after more than 20 s from its departure from the origin

Training test

Started	Wednesday, March 18 2020, 2:01 pm
State	Completed
terminated	Wednesday, March 18 2020, 2:17 pm
The time spent on	16 min 13 seconds
Score	1075.00 / 1200.00
Rating	**10.75 out** of a maximum of 12.00 (**90** %)

Question 1

Correct answer

Score 100.00 out of 100.00

A car travels at a speed of 10 m / s along a 1 km radius curve. How much is its centripetal acceleration?

- (to) $100\ m/s^2$
- (B) $1\ m/s^2$
- (C) $10\ m/s^2$
- (D) $0.1\ m/s^2$ ✓
- (e) It is not possible to calculate it if you do not know the time taken to travel the curve

Correct answer.

The correct answer is: $0.1\ m/s^2$

Question 2

Correct answer

Score 100.00 out of 100.00

Two arbitrary $\vec{a}$and $\vec{b}$planar vectors of forms $a$and are given b. Let it be $\vec{c} = \vec{a} + \vec{b}$. The form of $\vec{c}$:

- (A) is less than or equal to $a + b$. ✓
- (B) is always less than $a + b$.
- (C) is always greater than $a + b$.
- (D) is always equal to $a + b$.
- (E) is greater than or equal to $a + b$.

The correct answer is: it is less than or equal to $a + b$.

Question 3

Correct answer

Score 100.00 out of 100.00

A point charge $q = 3 \cdot 10^{-6}$ C, having a mass of $4 \cdot 10^{-3}$ kg, placed in a uniform electric field is subject to an acceleration equal in modulus to $6 \cdot 10^{2}$ m / s . How much is the electric field module worth?

- (a) $7.2 \cdot 10^{-11}$ V / m
- (b) $4.5 \cdot 10^{-6}$ V / m
- (c) $2.0 \cdot 10^{-6}$ V / m
- (d) 8.0 V / m ✓
- (e) 0.125 V / m

Correct answer.

The correct answer is: 8.0 V / m

Question 4

Correct answer

Score 100.00 out of 100.00

A block of wood resting on a horizontal plane is launched along a straight path with an initial speed of 6m / s, stopping after 10s. How much space did it travel, if its acceleration is constant?

- (a) 20m
- (b) 50m
- (c) a null space
- (d) 30m ✓
- (e) 15m

Correct answer.

The correct answer is: 30m

Question 5

Wrong answer

Score -25.00 out of 100.00

Which of the following units of measurement relating to the electrical field is a fundamental unit of the International System of Units?

- (to) Coulomb
- (B) Ampere
- (C) Farad
- (D) Ohm
- (is) Volt ✗

Wrong answer.

The correct answer is: Ampere

Question 6

Correct answer

Score 100.00 out of 100.00

The elastic forces of two springs, elongated by x_1 and x_2 respectively, have the same intensity. If $\frac{x_1}{x_2} = \frac{2}{3}$, how much is the ratio $\frac{k_1}{k_2}$ of elastic constants?

- (A) 1/4
- (B) 3/2 ✓
- (C) 1/2
- (D) 2/3
- (E) 4/3

The correct answer is: 3/2

Question 7

Correct answer

Score 100.00 out of 100.00

On the bottom of a swimming pool filled with water (density equal to 10^3 kg / m^3) the pressure is equal to 150 000 Pa. Knowing that the atmospheric pressure is 10^5 Pa and assuming the acceleration of gravity equal to 10 m / s^2, determine the depth h of the swimming pool

- (a) about 10 m
- (b) about 5 m ✓
- (c) about 0.5 m
- (d) about 3 m
- (e) can not be calculated with the data provided

Correct answer.

The correct answer is: about 5 m

Question 8

Correct answer

Score 100.00 out of 100.00

Two resistors R_1 and R_2 are connected in series. R_1 is the half of R_2 and a difference in potential is applied to the heads of the series V. Which of the following statements is wrong ?

- (A) the equivalent resistance of the series is triple of R_1
- (B) the potential difference across the leads R_1 is double the potential difference across the leads R_2 ✓
- (C) a current flows in the series $V/(3R_1)$
- (D) a power is dissipated in the series $V^2/(3R_1)$
- (E) the same current flows in both resistances

The correct answer is: the potential difference across heads R_1 is double the potential difference across heads R_2

Question 9

Correct answer

Score 100.00 out of 100.00

A container with rigid and hermetically sealed walls contains a perfect gas at temperature T $_1$ = 300 K and pressure p $_1$ = 1 Pa. At what pressure does the gas go if the container is cooled down to a temperature of T $_2$ = 270 K?

- (a) 11.1 Pa
- (b) 0.9 Pa ✓
- (c) 1.11 Pa
- (d) The pressure does not vary
- (e) 0.09 Pa

Correct answer.

The correct answer is: 0.9 Pa

Question 10

Correct answer

Score 100.00 out of 100.00

By supplying a power equal to 250 W for 4 minutes using a heater, 200 g of water are brought to a boil at an altitude close to sea level . In the absence of heat loss and by approximating the specific heat of the water to 4 J / (g ° C), how much is the initial water temperature worth?

- (a) about 305 K.
- (b) 75 ° C
- (c) 20 ° C
- (d) about 350 K
- (e) 25 ° C ✓

Correct answer.

The correct answer is: 25 ° C

Question 11

Correct answer

Score 100.00 out of 100.00

Complete the following statement: a joule is the work done by a force equal to a newton when its point of application

---

- (a) moves one meter in a direction perpendicular to that of force.
- (b) moves along any path, provided it is closed and of a length of one meter.
- (c) None of the other answers are correct.
- (d) does not move.
- (e) moves one meter in the direction and direction of the force. ✓

Correct answer.

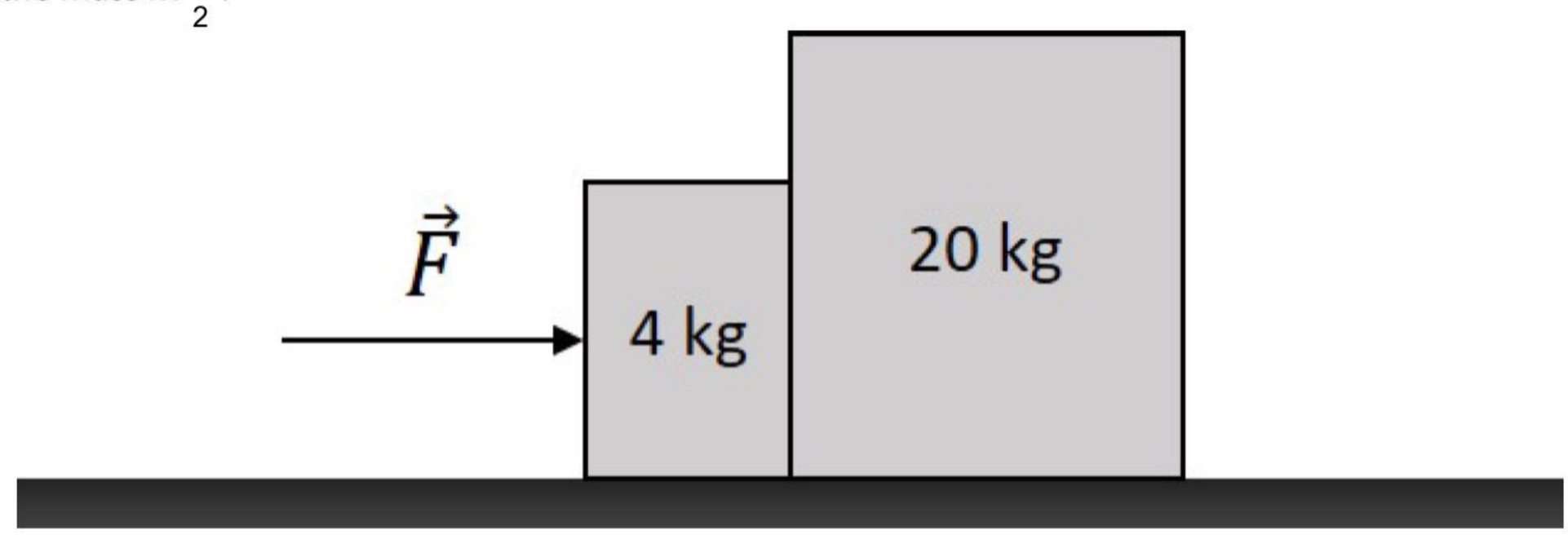
The correct answer is: it moves one meter in the direction and direction of the force.

Question 12

Correct answer

Score 100.00 out of 100.00

Two boxes of mass m_1 = 4 kg and m_2 = 20 kg are placed on a smooth surface. The force F = 12 N is applied to the mass m_1 (see figure). How much is the force F_{12} that the mass m_1 exerts on the mass m_2 ?



(a) F_{12} = 12 N

(b) F_{12} = 72 N

(c) F_{12} = 2 N

(d) F_{12} = 10 N ✓

(e) F_{12} = 4 N

Correct answer.

The correct answer is: F_{12} = 10 N

Training test

Started	Thursday, March 19 2020, 1:29 pm
State	Completed
terminated	Thursday, March 19 2020, 1:50 PM
The time spent on	21 min 9 seconds
Score	850,00 / 1200,00
Rating	**8.50 out** of a maximum of 12.00 (**71** %)

Question 1

Correct answer

Score 100.00 out of 100.00

Two point masses $m_A$and $m_B = 2m_A$resting on a horizontal smooth plane are each connected to a spring disposed horizontally, whose other end, and 'kept fixed. The two bodies swing on the plane. The springs both have elastic constant K. With the same deformation of the springs, what relationship is there between the acceleration modules of the two bodies?

- (A) It cannot be answered because the initial velocities of the two bodies are unknown
- (B) $a_B = 2a_A$
- (C) $a_A = 2a_B$ ✓
- (D) $a_A = a_B$
- (IS) $a_A = 2/Ka_B$

The correct answer is: $a_A = 2a_B$

Question 2

Wrong answer

Score -25.00 out of 100.00

A mass m = 1 kg of water a $0°C$and an equal mass of ice also a $0°C$ are placed in a container with perfectly insulating walls which is immediately sealed. If you reopen it after 1 hour, what can you find?

- (A) a certain mass of ice has melted so there is more than 1 kg of water and less than 1 kg of ice ✗
- (B) cannot be answered, because the answer depends on the outside temperature which is not known
- (C) that the ice has completely melted and therefore there are 2 kg of water a $0°C$
- (D) that the water has solidified and therefore there are 2 kg of ice
- (E) that nothing has changed: there is always 1 kg of water and 1 kg of ice

The correct answer is: that nothing has changed: there is always 1 kg of water and 1 kg of ice

Question 3

Correct answer

Score 100.00 out of 100.00

A mass body $m = 2\text{kg}$ is supported on a smooth horizontal plane and pulled horizontally to the right by a spring, of constant elasticity $k = 100\text{N/m}$, stretched by a stretch $x = 5\text{cm}$ with respect to its own length. How much is the acceleration of the body worth?

- (TO) 4m/s^2
- (B) 0.25m/s^2
- (C) 2.5m/s^2 ✓
- (D) 25m/s^2
- (IS) 40m/s^2

The correct answer is: 2.5m/s^2

Question 4

Correct answer

Score 100.00 out of 100.00

If a car is subject to a purely centripetal acceleration equal to 0.1m/s^2 while driving on a circular track of radius $R = 1\text{km}$, what value does the speedometer indicate?

- (TO) $100\ \text{m/s}$
- (B) $10\ \text{m/s}$ ✓
- (C) $36\ \text{m/s}$
- (D) $100\ \text{km/h}$
- (E) the speedometer shows increasing speeds, since the motion is accelerated

The correct answer is: $10\ \text{m/s}$

Question 5

Correct answer

Score 100.00 out of 100.00

In the electrical field, which of these relationships regarding the "volt" unit of measure is correct?

- (to) 1 volt = 1 οημ · ampere ✓
- (B) 1 volt = 1 coulomb · farad
- (C) 1 volt = 1 farad / coulomb
- (D) 1 volt = 1 οημ / ampere
- (is) 1 volt = 1 ampere / οημ

Correct answer.

The correct answer is: 1 volt = 1 οημ · ampere

Question 6

Correct answer

Score 100.00 out of 100.00

During a thermodynamic cycle, an ideal thermal machine absorbs heat $Q_2 > 0$ from a hot source and uses it to perform a job $L > 0$, transferring heat $Q_1 < 0$ to a cold source , with a yield of 20%. How much is the work done in relation to Q_1 worth ?

(a) $L = Q_1 /5$

(b) $L = - Q_1 /5$

(c) $L = 0$

(d) $L = - Q_1 /4$ ✓

(s) $L = Q_1 /4$

Correct answer.

The correct answer is: $L = - Q_1 /4$

Question 7

Correct answer

Score 100.00 out of 100.00

An object moves in a uniformly accelerated rectilinear motion with acceleration a for a time $t = 5\ s$, covering a distance $d = 8\ m$. If its initial velocity is $v_0 = 2\ m/s$, which of the following statements is correct?

(A) a and v_f have the same verse as v_0

(B) a has the same direction of v_0, v_f opposite

(C) a has opposite verse v_0, $v_f = 0$

(D) a has the same verse as v_0, $v_f = 0$

(E) a has opposite verse v_0; the final speed v_f has the same direction as v_0 ✓

The correct answer is: a has opposite verse v_0; the final speed v_f has the same direction as v_0

Question 8

Answer not given

Max score: 100.00

Calculate the value of the current intensity I flowing in a conductor where the drift velocity of the charge carriers (electrons) is $v_d = 2 \cdot 10^{-4}$ m / s and the circular section is $S = 5\ mm^2$. [Assume that the density of carriers is equal to $5 = 10^{28}\ m^{-3}$].

(a) I = 8 A

(b) I = 16 A

(c) I = 0.08 A

(d) I = 2 A

(e) I = 0.8 A

Wrong answer.

The correct answer is: I = 8 A

Question 9

Wrong answer

Score -25.00 out of 100.00

The surface of a conductive sphere is uniformly charged with a charge q. The electrostatic field at a point P located outside the sphere

- (a) is inversely proportional to the distance of the point P from the surface of the sphere
- (b) is inversely proportional to the distance of the point P from the center of the sphere
- (c) is inversely proportional to the square of the distance of the point P from the surface of the sphere ✗
- (d) is inversely proportional to the square of the distance of the point P from the center of the sphere
- (e) is always null

Wrong answer.

The correct answer is: it is inversely proportional to the square of the distance of the point P from the center of the sphere

Question 10

Correct answer

Score 100.00 out of 100.00

A ball is thrown upwards. Which of the following statements is false?

- (a) As the ball rises, the force of gravity opposes the motion.
- (b) As the ball rises, the force of gravity does positive work on it. ✓
- (c) The potential energy of the ball increases as it rises.
- (d) The kinetic energy of the ball decreases as it rises.
- (e) The kinetic energy of the ball is a function of its speed.

Correct answer.

The correct answer is: As the ball goes up, the force of gravity does positive work on it.

Question 11

Correct answer

Score 100.00 out of 100.00

According to Stevin's law, if the depth inside a liquid in static equilibrium increases

- (a) Stevin's law does not apply to liquids in static balance
- (b) the acceleration of gravity increases
- (c) the hydrostatic pressure decreases
- (d) the hydrostatic pressure remains unchanged
- (e) the hydrostatic pressure increases ✓

Correct answer.

The correct answer is: hydrostatic pressure increases

Question 12

Correct answer

Score 100.00 out of 100.00

Two vectors lying on the Cartesian plane (y, z), have the same module equal to 4 units. The first forms an angle equal to 25 ° with the y axis and the second forms an angle equal to 45 ° with the direction of the first vector. How much are the scalar and vector product of the first vector for the second? (indicate with $\hat{i}$, $\hat{j}$ and $\hat{k}$ the versors of the x, y and z axis, respectively)

- (a) scale = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$ ✓
- (b) scale = 4 ; vector = $16\hat{j}$
- (c) scale = 0; vector = $16\hat{k}$
- (d) scale = 0 ; vector = 0
- (e) scalar = 16; vector = $-16\hat{j}$

Correct answer.

The correct answer is: scalare = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$

Training test

Started	Sunday, March 22 2020, 4:23 pm
State	Completed
terminated	Sunday, March 22 2020, 4:43 pm
The time spent on	20 min 32 seconds
Score	1200.00 / 1200.00
Rating	**12.00** on a maximum of 12.00 (**100** %)

Question 1

Correct answer

Score 100.00 out of 100.00

Aluminum has a specific heat of $900\ J/(kgK)$. How much heat is needed to bring $500\ g$ aluminum from $25°C$ to $30°C$?

- (A) 2250000 J
- (B) cannot be answered because the specific heat is given in $J/(kgK)$ and instead the temperature in $°C$
- (C) 900 J
- (D) 2250 J ✓
- (E) 450 J

The correct answer is: 2250 J

Question 2

Correct answer

Score 100.00 out of 100.00

An object moves in a uniformly accelerated rectilinear motion with acceleration a for a time $t = 5\ s$, covering a distance $d = 8\ m$. If its initial velocity is $v_0 = 2\ m/s$, which of the following statements is correct?

- (A) a has opposite verse v_0; the final speed v_f has the same direction as v_0 ✓
- (B) a and v_f have the same verse as v_0
- (C) a has opposite verse v_0, $v_f = 0$
- (D) a has the same verse as v_0, $v_f = 0$
- (E) a has the same direction of v_0, v_f opposite

The correct answer is: a has opposite verse v_0; the final speed v_f has the same direction as v_0

Question 3

Correct answer

Score 100.00 out of 100.00

A copper wire has a section equal to 1.67 mm^2 and length L = 50 cm. The resistivity of copper at room temperature is 1.67 10^{-8} Ωm. Determine the resistance R measured at the ends.

(a) $R = 5.6 \cdot 10^{-1}$ Ω

(b) $R = 5.6 \cdot 10^{-8}$ Ω

(c) $R = 5.0 \cdot 10^{-9}$ Ω

(d) $R = 5.0 \cdot 10^{-3}$ Ω ✓

(e) $R = 5.0 \cdot 10^{-5}$ Ω

Correct answer.

The correct answer is: $R = 5.0 \cdot 10^{-3}$ Ω

Question 4

Correct answer

Score 100.00 out of 100.00

A body is subjected to two forces $\vec{F}_1$ and $\vec{F}_2$ modules $F_1 = 5N$ and $F_2 = 2N$, which form an angle between them $\theta = 60°$. How much is the modulus of the resulting force worth F_T?

(A) 30 N

(B) about 5.5 N

(C) just over 6 N ✓

(D) 7 N

(E) There is not enough data to answer

The correct answer is: just over 6 N

Question 5

Correct answer

Score 100.00 out of 100.00

The elastic forces of two springs, elongated by x_1 and x_2 respectively, have the same intensity. If $\frac{x_1}{x_2} = \frac{2}{3}$, how much is the ratio $\frac{k_1}{k_2}$ of elastic constants?

(A) 2/3

(B) 4/3

(C) 1/4

(D) 3/2 ✓

(E) 1/2

The correct answer is: 3/2

Question 6

Correct answer

Score 100.00 out of 100.00

To a point body of mass m = 1 kg, in motion with speed v = 20 m / s, a force is applied which decreases its speed up to 10 m / s. If no other forces act on the body, it can be said that:

- (a) the work of the force is equal to –150 J. ✓
- (b) Nothing can be said without knowing how long the force acts.
- (c) the work of force is nil.
- (d) None of the other answers are correct
- (e) the work of the force is equal to 150 J.

Correct answer.

The correct answer is: the work of strength is equal to -150 J.

Question 7

Correct answer

Score 100.00 out of 100.00

The efficiency of a thermal machine that completes a Carnot cycle is equal to 0.8. Knowing that it absorbs heat from a hot source that is at the temperature T_C = 1000 K, at what temperature T_F is a cold source?

- (a) 250 K
- (b) 400 K
- (c) 800 K
- (d) 360 K
- (e) 200 K ✓

Correct answer.

The correct answer is: 200K

Question 8

Correct answer

Score 100.00 out of 100.00

Archimedes' thrust on a body completely immersed in a fluid only depends

- (a) by the acceleration of gravity and the depth at which the body is located
- (b) from the depth at which the body is located and from its mass
- (c) the volume of the body and the density of the fluid ✓
- (d) the weight of the body and the density of the fluid
- (e) the depth at which the body is located and the volume of fluid moved

Correct answer.

The correct answer is: from the volume of the body and the density of the fluid

Question 9

Correct answer

Score 100.00 out of 100.00

Two charged particles are placed at a distance of 10 cm from each other. They are moved and the force between them quadruples. How far are they now?

- (A) 5 cm ✓
- (B) 2.5 cm
- (C) 25 cm
- (D) you can't answer if you don't know how much the charges are worth
- (E) 40 cm

The correct answer is: 5 cm

Question 10

Correct answer

Score 100.00 out of 100.00

A body of mass m , subjected to the action of a force F , moves with acceleration equal to a . If, keeping the force constant, we halve the mass m , the acceleration of the system:

- (a) doubles ✓
- (b) nothing can be said about the acceleration of the system because it depends on the value of F
- (c) nothing can be said about the acceleration of the system because it depends on the value of m
- (d) remains constant
- (e) is halved

Correct answer.

The correct answer is: double

Question 11

Correct answer

Score 100.00 out of 100.00

In the electrical field, which of these relationships regarding the "volt" unit of measure is correct?

- (to) 1 volt = 1 οημ / ampere
- (B) 1 volt = 1 farad / coulomb
- (C) 1 volt = 1 οημ · ampere ✓
- (D) 1 volt = 1 ampere / οημ
- (is) 1 volt = 1 coulomb · farad

Correct answer.

The correct answer is: 1 volt = 1 οημ · ampere

Question 12

Correct answer

Score 100.00 out of 100.00

If a car is subject to a purely centripetal acceleration equal to $0.1 \mathrm{m/s^2}$ while driving on a circular track of radius $R = 1 \mathrm{km}$, what value does the speedometer indicate?

- (TO) $100 \mathrm{\ m/s}$
- (B) the speedometer shows increasing speeds, as the motion is accelerated
- (C) $36 \mathrm{\ m/s}$
- (D) $10 \mathrm{\ m/s}$ ✓
- (IS) $100 \mathrm{\ km/h}$

The correct answer is: $10 \mathrm{\ m/s}$

Training test

Started	Friday, March 27 2020, 6:14 PM
State	Completed
terminated	Friday, March 27 2020, 6:32 pm
The time spent on	17 min 30 seconds
Score	1200.00 / 1200.00
Rating	**12.00** on a maximum of 12.00 (**100** %)

Question 1

Correct answer

Score 100.00 out of 100.00

A mass body $m = 2\text{kg}$ is supported on a smooth horizontal plane and pulled horizontally to the right by a spring, of constant elasticity $k = 100\text{N/m}$, stretched by a stretch $x = 5\text{cm}$ with respect to its own length. How much is the acceleration of the body worth?

- (TO) 40m/s^2
- (B) 0.25m/s^2
- (C) 2.5m/s^2 ✓
- (D) 4m/s^2
- (IS) 25m/s^2

The correct answer is: 2.5m/s^2

Question 2

Correct answer

Score 100.00 out of 100.00

Calculate the value of the current intensity I flowing in a conductor where the drift velocity of the charge carriers (electrons) is $v_d = 2 \cdot 10^{-4}$ m / s and the circular section is $S = 5 \text{ mm}^2$. [Assume that the density of carriers is equal to $5 = 10^{28}$ m $^{-3}$].

- (a) I = 8 A ✓
- (b) I = 2 A
- (c) I = 16 A
- (d) I = 0.08 A
- (e) I = 0.8 A

Correct answer.

The correct answer is: I = 8 A

Question 3

Correct answer

Score 100.00 out of 100.00

If the dimensions of mass, length and time are indicated with [M], [L] and [T] respectively, the dimensions of the tangential acceleration are:

(a) $[L]^{-2}\ [T]^{-2}$

(b) $[M]\ [L]\ [T]^{-2}$

(c) $[L]\ [T]^{-2}$ ✓

(d) $[L]\ [T]^{2}$

(e) $[L]^{-2}\ [T]^{-2}$

Correct answer.

The correct answer is: $[L]\ [T]^{-2}$

Question 4

Correct answer

Score 100.00 out of 100.00

A body dropped from the roof of a building hits the ground after t = 5 s. If the building was located on a planet without an atmosphere, where the gravitational acceleration was worth at $= 6\ m/s^2$, what would be the height of the building?

(a) h = 750 m

(b) h = 100 m

(c) h = 75 m ✓

(d) h = 30 m

(e) h = 300 m

Correct answer.

The correct answer is: h = 75 m

Question 5

Correct answer

Score 100.00 out of 100.00

A mass m = 1 kg of water a $0°C$ and an equal mass of ice also a $0°C$ are placed in a container with perfectly insulating walls which is immediately sealed. If you reopen it after 1 hour, what can you find?

(A) that the ice has completely melted and therefore there are 2 kg of water a $0°C$

(B) a certain mass of ice has melted so there is more than 1 kg of water and less than 1 kg of ice

(C) cannot be answered, because the answer depends on the outside temperature which is not known

(D) that the water has solidified and therefore there are 2 kg of ice

(E) that nothing has changed: there is always 1 kg of water and 1 kg of ice ✓

The correct answer is: that nothing has changed: there is always 1 kg of water and 1 kg of ice

Question 6

Correct answer

Score 100.00 out of 100.00

A coin is thrown upwards to a height of 50cm from the launch point: what speed did it have at the beginning of the upward motion? (approximate the acceleration of gravity a 10m/s^2)

- (About 3m/s ✓
- (B) approx 10m/s
- (C) approx 9m/s
- (D) cannot be answered if the mass of the coin is not known
- (E) approx 0.33m/s

The correct answer is: approx 3m/s

Question 7

Correct answer

Score 100.00 out of 100.00

2 vectors are given and in the plane, of modules $|\vec{a}\,\vec{b}\,\vec{a}| = 5$ and $|\vec{b}| = 5$. How much is the modulus of their vector difference = - knowing that the angle between the vectors and $\vec{d}\,\vec{a}\;\vec{b}\,\vec{a}\;\vec{b}$ is it 60 °?

- (a) 5 ✓
- (b) 25
- (c) 50
- (d) none of the other answers are correct
- (e) 15

Correct answer.

The correct answer is: 5

Question 8

Correct answer

Score 100.00 out of 100.00

A motor with a maximum power of $9 \cdot 10^4$ W is used to operate a freight elevator that weighs $1.5 \cdot 10^4$ N when empty . What is the maximum weight of the load placed in the hoist that this motor can lift at an average speed of 3 m / s?

- (a) None of the other answers are correct
- (b) There is not enough data to respond.
- (c) 1.510^4 N ✓
- (d) 4510^4 N
- (e) 7.510^4 N

Correct answer.

The correct answer is: $1.5 \cdot 10^4$ N

Question 9

Correct answer

Score 100.00 out of 100.00

A point charge $q = 3 \cdot 10^{-6}$ C, having a mass of $4 \cdot 10^{-3}$ kg, placed in a uniform electric field is subject to an acceleration equal in modulus to $6 \cdot 10^{2}$ m / s . How much is the electric field module worth?

- (a) 0.125 V / m
- (b) $7.2 \cdot 10^{-11}$ V / m
- (c) $2.0 \cdot 10^{-6}$ V / m
- (d) $4.5 \cdot 10^{-6}$ V / m
- (e) 8.0 V / m ✓

Correct answer.

The correct answer is: 8.0 V / m

Question 10

Correct answer

Score 100.00 out of 100.00

$n$moles of perfect gas are located in a container of volume $V$and pressure p. How much is the absolute temperature $T$of the gas worth ?

- (TO) $T = \frac{pV}{nR}$ ✓
- (B) $T = \frac{pV}{n}$
- (C) $T = \frac{nR}{pV}$
- (D) $T = \frac{pV}{R}$
- (IS) $T = \frac{npV}{R}$

The correct answer is: $T = \frac{pV}{nR}$

Question 11

Correct answer

Score 100.00 out of 100.00

A liquid in stationary motion flows in a horizontal tube. If at a certain point in the tube its diameter increases, what effects can be observed on the flow of liquid?

- (a) In the section of pipe with a larger diameter, the flow rate decreases and the speed of the liquid increases
- (b) In the section of pipe with a larger diameter, the flow rate and speed of the liquid remain unchanged
- (c) In the section of pipe with a larger diameter, the speed of the liquid decreases and the flow rate remains constant ✓
- (d) In the absence of sufficient information on the pressure value, it is not possible to answer
- (e) In the section of pipe with a larger diameter, the speed of the liquid increases and the flow rate remains constant

Correct answer.

The correct answer is: In the section of pipe with a larger diameter, the speed of the liquid decreases and the flow rate remains constant

Question 12

Correct answer

Score 100.00 out of 100.00

A warrior rotates the "bolas" (a rope with a stone attached to one end) on his head with an angular speed of 2 rad / s. At some point he lets them go to hit the opponent. If the bolas rope is 0.5 m long, how fast are the bolas thrown?

- (a) 1 m / s ✓
- (b) 0.25 m / s
- (c) 2m / s
- (d) 4 m / s
- (e) It is not possible to calculate it because it needs to know the mass of the thrown object.

Correct answer.

The correct answer is: 1 m / s

Training test

Started	Tuesday, March 31 2020, 12:44 PM
State	Completed
terminated	Tuesday, March 31 2020, 12:56 PM
The time spent on	11 mins 36 seconds
Score	975,00 / 1200,00
Rating	**9.75 out** of a maximum of 12.00 (**81** %)

Question 1

Correct answer

Score 100.00 out of 100.00

During a succession of thermodynamic transformations, a gas absorbs a quantity of heat from the outside $Q = 10000$ J, transfers a quantity of heat to the outside $|Q| = 3000$ J and do a job $L = 2000$ J. In the end, how much has the internal energy of the gas changed?

- (A) increased by 15000 J
- (B) increased by 5000 J ✓
- (C) decreased by 9000 J
- (D) decreased by 5000 J
- (E) increased by 9000 J

The correct answer is: it has increased by 5000 J

Question 2

Correct answer

Score 100.00 out of 100.00

A ball is thrown upwards. Which of the following statements is false?

- (a) As the ball rises, the force of gravity opposes the motion.
- (b) As the ball rises, the force of gravity does positive work on it. ✓
- (c) The kinetic energy of the ball is a function of its speed.
- (d) The potential energy of the ball increases as it rises.
- (e) The kinetic energy of the ball decreases as it rises.

Correct answer.

The correct answer is: As the ball goes up, the force of gravity does positive work on it.

Question 3

Correct answer

Score 100.00 out of 100.00

A body of mass m , subjected to the action of a force F , moves with acceleration equal to a . If, keeping the force constant, we halve the mass m , the acceleration of the system:

- (a) doubles ✓
- (b) nothing can be said about the acceleration of the system because it depends on the value of m
- (c) is halved
- (d) nothing can be said about the acceleration of the system because it depends on the value of F
- (e) remains constant

Correct answer.

The correct answer is: double

Question 4

Correct answer

Score 100.00 out of 100.00

Two vectors lying on the Cartesian plane (y, z), have the same module equal to 4 units. The first forms an angle equal to 25 ° with the y axis and the second forms an angle equal to 45 ° with the direction of the first vector. How much are the scalar and vector product of the first vector for the second? (indicate with $\hat{i}$, $\hat{j}$ and $\hat{k}$ the versors of the x, y and z axis, respectively)

- (a) scale = 0 ; vector = 0
- (b) scale = 0; vector = $16\hat{k}$
- (c) scalar = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$ ✓
- (d) scale = 4 ; vector = $16\hat{j}$
- (e) scalar = 16; vector = $-16\hat{j}$

Correct answer.

The correct answer is: scalare = $8\sqrt{2}$; vector = $8\sqrt{2}\,\hat{i}$

Question 5

Answer not given

Max score: 100.00

In an oven that delivers a constant power P = 333 W, an ice cube of mass m = 1 kg is placed at 0 ° C. Knowing that all the ice will melt in 1000 s, determine the value of the latent heat of melting λ of the ice.

- (to) $\lambda = 111$ kJ / kg
- (B) $\lambda = 333$ kJ / kg
- (C) $\lambda = 999$ kJ / kg
- (D) $\lambda = 222$ kJ / kg
- (is) $\lambda = 666$ kJ / kg

Wrong answer.

The correct answer is: $\lambda = 333$ kJ / kg

Question 6

Wrong answer

Score -25.00 out of 100.00

If the intensity of current flowing through a resistance within a circuit doubles, how does the heat produced on it change per unit of time due to the Joule effect?

- (A) does not change
- (B) doubles ✗
- (C) is halved
- (D) becomes 1/4
- (E) quadruples

The correct answer is: quadruple

Question 7

Correct answer

Score 100.00 out of 100.00

What force do we have to apply to lift an object from the ground?

- (a) A force directed downwards and with a modulus greater than the weight of the object
- (b) A force directed downwards and with modulus greater than zero
- (c) A force directed upwards and with modulus greater than zero
- (d) It depends on the shape of the body
- (e) A force directed upwards and with a modulus greater than the weight of the object ✓

Correct answer.

The correct answer is: A force directed upwards and with a modulus greater than the weight of the object

Question 8

Correct answer

Score 100.00 out of 100.00

The oil flows, filling it completely, in a square section tube with a side equal to 10 cm, at an average speed of 20 m / s. It can be said that:

- (a) The volume flow rate is approximately 0.02 m^3 / s
- (b) The volume flow rate is approximately 4 m^3 / s
- (c) The volume flow rate is approximately 1.5 m^3 / s
- (d) To know the volume flow rate, the density of the oil should be known
- (e) The volume flow rate is approximately 0.2 m^3 / s ✓

Correct answer.

The correct answer is: The volume flow is equal to about 0.2 m^3 / s

Question 9

Correct answer

Score 100.00 out of 100.00

Inside a copper sphere the electric field is initially zero. If a negative charge is distributed on the sphere, the electric field inside will be

- (A) positive but decreasing towards the center of the sphere
- (B) null only in the center of the sphere
- (C) positive
- (D) negative
- (E) null ✓

The correct answer is: null

Question 10

Correct answer

Score 100.00 out of 100.00

A body moves with uniform circular motion on a circumference of radius $R = 0.2\mathrm{m}$. Its speed module is $v = 2\mathrm{m}/\mathrm{s}$. How much is its angular velocity worth ω?

- (A) $0,4$ rad / s
- (B) 2π rad / s
- (C) 1 rad / s
- (D) 10 rad / s ✓
- (E) 4π rad / s

The correct answer is: 10 rad / s

Question 11

Correct answer

Score 100.00 out of 100.00

In the electrical field, which of these relationships regarding the "volt" unit of measure is correct?

(to) 1 volt = 1 ampere / οημ

(B) 1 volt = 1 coulomb · farad

(C) 1 volt = 1 farad / coulomb

(D) 1 volt = 1 οημ · ampere ✓

(is) 1 volt = 1 οημ / ampere

Correct answer.

The correct answer is: 1 volt = 1 οημ · ampere

Question 12

Correct answer

Score 100.00 out of 100.00

A car moves in a straight direction, starting from a standstill, with constant acceleration equal to $10m / s^2$. What will be your speed after covering 45m?

(a) 20m / s

(b) 5m / s

(c) 50m / s

(d) 40m / s

(e) 30m / s ✓

Correct answer.

The correct answer is: 30m / s

Training test

Started	Tuesday, March 31 2020, 1:14 pm
State	Completed
terminated	Tuesday, March 31 2020, 1:23 pm
The time spent on	9 min 1 second
Score	950,00 / 1200,00
Rating	**9.50** on a maximum of 12.00 (**79** %)

Question 1

Correct answer

Score 100.00 out of 100.00

An object moves in a uniformly accelerated rectilinear motion with acceleration a for a time $t = 5\,s$, covering a distance $d = 8\,m$. If its initial velocity is $v_0 = 2\,m/s$, which of the following statements is correct?

- (A) a has the same verse as v_0, $v_f = 0$
- (B) a and v_f have the same verse as v_0
- (C) a has opposite verse v_0; the final speed v_f has the same direction as v_0 ✓
- (D) a has the same direction of v_0, v_f opposite
- (E) a has opposite verse v_0, $v_f = 0$

The correct answer is: a has opposite verse v_0; the final speed v_f has the same direction as v_0

Question 2

Correct answer

Score 100.00 out of 100.00

A body dropped from the roof of a building hits the ground after t = 5 s. If the building was located on a planet without an atmosphere, where the gravitational acceleration was worth $a = 6\ m/s^2$, what would be the height of the building?

- (a) h = 750 m
- (b) h = 75 m ✓
- (c) h = 100 m
- (d) h = 300 m
- (e) h = 30 m

Correct answer.

The correct answer is: h = 75 m

Question 3

Wrong answer

Score -25.00 out of 100.00

A body starts from a stationary top of a smooth inclined plane of length $L = 2.5$ m and angle at the top $\theta = 30\,°$. Considering $g = 10\ \text{m/s}^2$, the time t taken by the body to reach the base of the plane is:

- (a) $t = 1$ s
- (b) $t = 4$ s
- (c) I can't tell if I don't know the mass of the body ✗
- (d) $t = 3$ s
- (e) $t = 2$ s

Wrong answer.

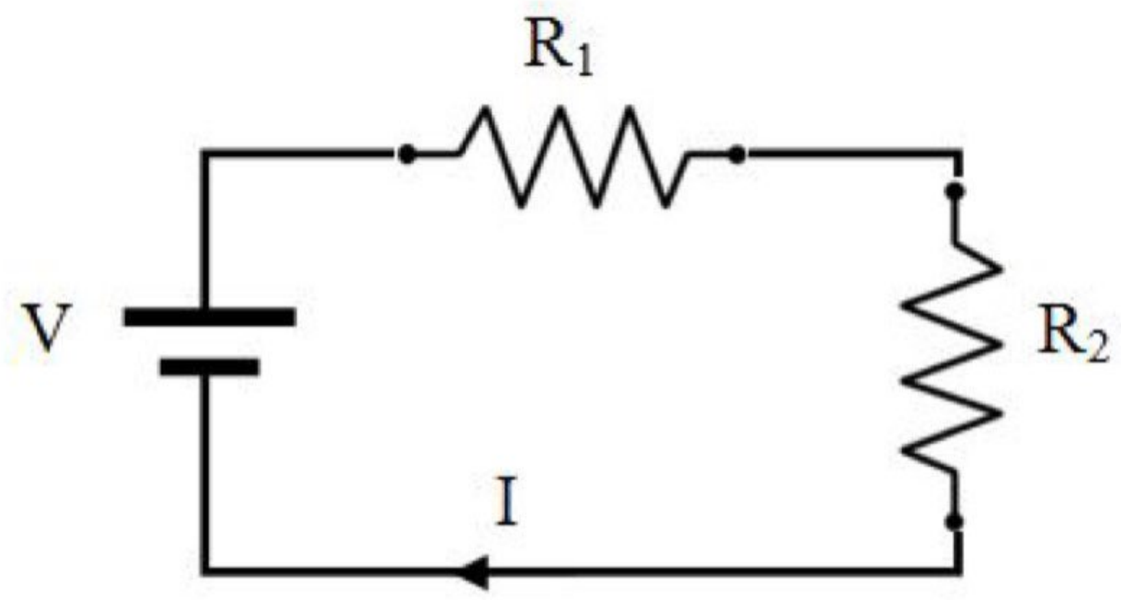
The correct answer is: $t = 1$ s

Question 4

Correct answer

Score 100.00 out of 100.00

Consider the circuit shown in the figure, where $R_1 = 10\,\Omega, V = 30\,\text{V}$, and the current and $' I = 2\,\text{A}$. How much is the resistance worth R_2?



- (TO) $R_2 = 1\,\Omega$
- (B) $R_2 = 5\,\Omega$ ✓
- (C) $R_2 = 15\,\Omega$
- (D) $R_2 = 10\,\Omega$
- (IS) $R_2 = 7.5\,\Omega$

The correct answer is: $R_2 = 5\,\Omega$

Question 5

Correct answer

Score 100.00 out of 100.00

In an oven that delivers a constant power P = 333 W, an ice cube of mass m = 1 kg is placed at 0 ° C. Knowing that all the ice will melt in 1000 s, determine the value of the latent heat of melting λ of the ice.

- (to) $\lambda = 666$ kJ / kg
- (B) $\lambda = 111$ kJ / kg
- (C) $\lambda = 222$ kJ / kg
- (D) $\lambda = 999$ kJ / kg
- (is) $\lambda = 333$ kJ / kg ✓

Correct answer.

The correct answer is: $\lambda = 333$ kJ / kg

Question 6

Wrong answer

Score -25.00 out of 100.00

A man must carry a heavy crate from the ground floor to the first floor of a warehouse. To do this, he can push it along one of the two ramps he has available: a longer and less inclined and a shorter and more inclined. If man climbs in any case with the same constant speed, which ramp requires him to exercise more power? Neglect friction,

---

- (a) In the case of the less inclined ramp, since it takes longer.
- (b) In the case of the most inclined ramp, since it takes less time.
- (c) None of the other answers are correct
- (d) The ramps are equivalent, because the power is however always zero, since there is no friction. ✗
- (e) The ramps are equivalent, because the power depends only on the difference in altitude of the floors.

Wrong answer.

The correct answer is: In the case of the more inclined ramp, since it takes less time.

Question 7

Correct answer

Score 100.00 out of 100.00

2 vectors are given and in the plane, of modules $|\vec{a}\,\vec{b}\,\vec{a}| = 5$ and $|\vec{b}| = 5$. How much is the modulus of their vector difference = - knowing that the angle between the vectors and $\vec{d}\,\vec{a}\;\vec{b}\,\vec{a}\;\vec{b}$ is it 60 °?

- (a) none of the other answers are correct
- (b) 50
- (c) 5 ✓
- (d) 25
- (e) 15

Correct answer.

The correct answer is: 5

Question 8

Correct answer

Score 100.00 out of 100.00

On the bottom of a swimming pool filled with water (density equal to 10^3 kg / m^3) the pressure is equal to 150 000 Pa. Knowing that the atmospheric pressure is 10^5 Pa and assuming the acceleration of gravity equal to 10 m / s^2, determine the depth h of the swimming pool

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- (a) about 0.5 m
- (b) about 3 m
- (c) about 5 m ✓
- (d) about 10 m
- (e) can not be calculated with the data provided

Correct answer.

The correct answer is: about 5 m

Question 9

Correct answer

Score 100.00 out of 100.00

The efficiency of a thermal machine that completes a Carnot cycle is equal to 0.8. Knowing that it absorbs heat from a hot source that is at the temperature T_C = 1000 K, at what temperature T_F is a cold source?

- (a) 800 K
- (b) 360 K
- (c) 200 K ✓
- (d) 250 K
- (e) 400 K

Correct answer.

The correct answer is: 200K

Question 10

Correct answer

Score 100.00 out of 100.00

A $4 \cdot 10^{-6}$ C charge particle moves from a 100 V potential point to a 20 V potential point. How much is the work done by the electrostatic field on the charge in absolute terms?

- (a) $2.0 \cdot 10^{7}$ J
- (b) $4.0 \cdot 10^{6}$ J
- (c) $5.0 \cdot 10^{-4}$ J
- (d) $3.2 \cdot 10^{-5}$ J ✓
- (e) $8.0 \cdot 10$ J

Correct answer.

The correct answer is: $3.2 \cdot 10^{-4}$ J

Question 11

Correct answer

Score 100.00 out of 100.00

In the International System, a vector quantity is measured in $kg\ m^2/s^2$. What size could it be?

- (A) Momentum
- (B) Entropy
- (C) Moment of momentum
- (D) Impulse of a force
- (E) Moment of a force ✓

The correct answer is: Moment of a force

Question 12

Correct answer

Score 100.00 out of 100.00

In a circular motion, knowing angular velocity and radius:

- (a) It is possible to calculate the tangential acceleration, if the mass and the centripetal acceleration are also known
- (b) It is possible to calculate the tangential speed ✓
- (c) None of the other answers are correct
- (d) It is possible to calculate the tangential acceleration, if the mass is also known
- (e) The centripetal force can be calculated

Correct answer.

The correct answer is: It is possible to calculate the tangential speed

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