

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 $Q_1 > 0$ from a hot source and uses it to perform a job $L > 0$, transferring heat $Q_2 < 0$ 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 $6 \cdot 10^{-6}$ m / s². How much is the electric field module worth?

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

Correct answer.

The correct answer is: $8.0 \cdot 10^{-6} \text{ V / m}$ **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 °C)
- ☐ (C) cal / (g °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 $g = 10 \text{ m / s}^2$

- ☐ (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 $9 \cdot 10^4 \text{ W}$ is used to operate a freight elevator that weighs $1.5 \cdot 10^4 \text{ N}$ 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) $7.5 \cdot 10^4 \text{ N}$
- ☐ (b) There is not enough data to respond.
- ☐ (c) $1.5 \cdot 10^4 \text{ N}$
- ☐ (d) None of the other answers are correct
- ☐ (e) $4.5 \cdot 10^4 \text{ N}$

Wrong answer.

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

Question 11

Correct answer

Score 100.00 out of
100.00

A trolley of mass $M = 25 \text{ kg}$ 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) $F = 200 \text{ N}$
- ☒ (b) $F = 400 \text{ N}$ ✓
- ☐ (c) $F = 40 \text{ N}$
- ☐ (d) $F = 2000 \text{ N}$
- ☐ (e) $F = 4000 \text{ N}$

Correct answer.

The correct answer is: $F = 400 \text{ N}$ **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