calc1all:Study

The LaTex code that creates this quiz is released to the Public Domain
Attribution for each question is documented in the Appendix
https://bitbucket.org/Guy_vandegrift/qbwiki/wiki/Home
https://en.wikiversity.org/wiki/Quizbank
mixed quiz 154714001845

Thursday 10th January, 2019

Though posted on Wikiversity, this document was created without wikitex using Python to write LaTeX markup. With a bit more development it will be possible for users to download and use software that will permit them to create, modify, and print their own versions of this document.

This document contains all questions that might be on the test. Students are not expected to learn the answers to all questions in this document. And questions not in this document may appear on tests and exams. Only one "rendition" is shown for the numerical questions, which means that the numerical values might differ from that shown in a question.

Contents

1 b_motionSimpleArithmetic

1. Mr. Smith starts from rest and accelerates to 4 m/s in 3 seconds. How far did he travel?[1]
   - A. 3.0 meters
   - B. 4.0 meters
   - C. 5.0 meters
   - **D. 6.0 meters**
   - E. 7.0 meters
2. Mr. Smith starts from rest and accelerates to 4 m/s in 5 seconds. How far did he travel?[2]
   - A. 7.0 meters
   - B. 8.0 meters
   - C. 9.0 meters

The next page might contain more answer choices for this question

D. 10.0 meters

E. 11.0 meters

3. Mr. Smith is driving at a speed of 7 m/s, when he slows down to a speed of 5 m/s, when he hits a wall at this speed, after travelling for 2 seconds. How far did he travel? [3]

A. 8.0 meters

B. 9.0 meters

C. 10.0 meters

D. 11.0 meters

E. 12.0 meters

4. Mr. Smith starts at rest and accelerates to a speed of 2 m/s, in 2 seconds. He then travels at this speed for an additional 1 seconds. Then he decelerates uniformly, taking 2 seconds to come to rest. How far did he travel?[4]

A. 5.0 meters

B. 6.0 meters

C. 7.0 meters

D. 8.0 meters

E. 9.0 meters

5. Mr. Smith is driving at a speed of 4 m/s, when he slows down to a speed of 1 m/s, when he hits a wall at this speed, after travelling for 4 seconds. How far did he travel? [5]

A. 7.0 meters

B. 8.0 meters

C. 9.0 meters

D. 10.0 meters

E. 11.0 meters

6. Mr. Smith starts at rest and accelerates to a speed of 4 m/s, in 2 seconds. He then travels at this speed for an additional 3 seconds. Then he decelerates uniformly, taking 2 seconds to come to rest. How far did he travel?[6]

A. 19.0 meters

B. 20.0 meters

C. 21.0 meters

D. 22.0 meters

E. 23.0 meters

7. Mr. Smith starts from rest and accelerates to 2 m/s in 3 seconds. How far did he travel?[7]

A. 3.0 meters

B. 4.0 meters

C. 5.0 meters

D. 6.0 meters

E. 7.0 meters

8. Mr. Smith is driving at a speed of 5 m/s, when he slows down to a speed of 4 m/s, when he hits a wall at this speed, after travelling for 2 seconds. How far did he travel? [8]

The next page might contain more answer choices for this question

A. 8.0 meters
B. 9.0 meters
C. 10.0 meters
D. 11.0 meters
E. 12.0 meters

9. Mr. Smith starts at rest and accelerates to a speed of 2 m/s, in 6 seconds. He then travels at this speed for an additional 3 seconds. Then he decelerates uniformly, taking 4 seconds to come to rest. How far did he travel?[9]
   A. 16.0 meters
   B. 17.0 meters
   C. 18.0 meters
   D. 19.0 meters
   E. 20.0 meters

10. Mr. Smith starts from rest and accelerates to 3 m/s in 2 seconds. How far did he travel?[10]
   A. 1.0 meters
   B. 2.0 meters
   C. 3.0 meters
   D. 4.0 meters
   E. 5.0 meters

11. Mr. Smith is driving at a speed of 7 m/s, when he slows down to a speed of 5 m/s, when he hits a wall at this speed, after travelling for 4 seconds. How far did he travel? [11]
   A. 23.0 meters
   B. 24.0 meters
   C. 25.0 meters
   D. 26.0 meters
   E. 27.0 meters

12. Mr. Smith starts at rest and accelerates to a speed of 2 m/s, in 6 seconds. He then travels at this speed for an additional 3 seconds. Then he decelerates uniformly, taking 4 seconds to come to rest. How far did he travel?[12]
   A. 13.0 meters
   B. 14.0 meters
   C. 15.0 meters
   D. 16.0 meters
   E. 17.0 meters

2 b_velocityAcceleration

1. When a table cloth is quickly pulled out from under dishes, they hardly move. This is because[13]
   A. the cloth is more slippery when it is pulled quickly
   B. the cloth is accelerating for such a brief time that there is little motion
   C. objects don't begin to accelerate until after the force has been applied

The next page might contain more answer choices for this question

2. If you toss a coin into the air, the acceleration while it as its highest point is[14]

   A. up

   B. down

   C. zero

3. If you toss a coin into the air, the velocity on the way up is[15]

   A. zero

   B. down

   C. up

4. If you toss a coin into the air, the velocity on the way down is[16]

   A. down

   B. zero

   C. up

5. If you toss a coin into the air, the velocity while it as its highest point is[17]

   A. up

   B. zero

   C. down

6. A car is headed due north and increasing its speed. It is also turning left because it is also traveling in a perfect circle. The acceleration vector points[18]

   A. northwest

   B. south

   C. southwest

   D. north

   E. northeast

7. A car is headed due north and increasing its speed. It is also turning right because it is also traveling in a perfect circle. The acceleration vector points[19]

   A. southwest

   B. south

   C. northwest

   D. north

   E. northeast

8. A car is headed due north and increasing its speed. It is also turning left because it is also traveling in a perfect circle. The velocity vector points[20]

   A. northeast

   B. southeast

   C. northeast

   D. northwest

   E. north

The next page might contain more answer choices for this question

9. A car is headed due north and increasing its speed. It is also turning right because it is also traveling in a perfect circle. The velocity vector points[21]

   A. north

   B. northwest

   C. south

   D. northeast

   E. southwest

10. A car is headed due north and decreasing its speed. It is also turning left because it is also traveling in a perfect circle. The acceleration vector points[22]

    A. west

    B. northwest

    C. southwest

    D. southeast

    E. south

11. A car is headed due north and decreasing its speed. It is also turning right because it is also traveling in a perfect circle. The acceleration vector points[23]

    A. northwest

    B. north

    C. south

    D. northeast

    E. southeast

12. A car is traveling west and slowing down. The acceleration is[24]

    A. zero

    B. to the east

    C. to the west

13. A car is traveling east and slowing down. The acceleration is[25]

    A. zero

    B. to the east

    C. to the west

14. A car is traveling east and speeding up. The acceleration is[26]

    A. to the east

    B. to the west

    C. zero

15. If you toss a coin into the air, the acceleration on the way up is[27]

    A. down

    B. zero

    C. up

The next page might contain more answer choices for this question

16. A car is traveling in a perfect circle at constant speed. If the car is headed north while turning west, the acceleration is[28]

    A. west

    B. zero

    C. south

    D. north

    E. east

17. A car is traveling in a perfect circle at constant speed. If the car is headed north while turning east, the acceleration is[29]

    A. east

    B. south

    C. north

    D. zero

    E. west

18. As the Moon circles Earth, the acceleration of the Moon is[30]

    A. away from Earth

    B. towards Earth

    C. opposite the direction of the Moon's velocity

    D. in the same direction as the Moon's velocity

    E. zero

19. If you toss a coin into the air, the acceleration on the way down is[31]

    A. up

    B. down

    C. zero

3 a02_1Dkinem_definitions

1. A car traveling at 35.3 miles/hour stops in 4.3 seconds. What is the average acceleration?[32]

    A. 2.06×10^0 m/s^2

    B. 3.67×10^0 m/s^2

    C. 6.53×10^0 m/s^2

    D. 1.16×10^1 m/s^2

    E. 2.06×10^1 m/s^2

2. A car completes a complete circle of radius 3.1 miles at a speed of 51 miles per hour. How many minutes does it take?[33]

    A. 7.25×10^0 minutes

    B. 9.66×10^0 minutes

    C. 1.29×10^1 minutes

    D. 1.72×10^1 minutes

The next page might contain more answer choices for this question

E. 2.29×10^{1} minutes

3. A car traveling at 21.3 mph increases its speed to 24.2 mph in 1.4seconds. What is the average acceleration?[34]

   A. 9.26×10^{-1} m/s^2

   B. 1.65×10^{0} m/s^2

   C. 2.93×10^{0} m/s^2

   D. 5.21×10^{0} m/s^2

   E. 9.26×10^{0} m/s^2

4. Mr. Smith is backing his car at a speed of 3.28 mph when he hits a cornfield (seed corn). In the course of 1.92 seconds he stops, puts his car in forward drive, and exits the field at a speed of 5.66 mph. What was the "magnitude" (absolute value) of his acceleration?[35]

   A. 2.94×10^{0} miles per hour per second

   B. 3.7×10^{0} miles per hour per second

   C. 4.66×10^{0} miles per hour per second

   D. 5.86×10^{0} miles per hour per second

   E. 7.38×10^{0} miles per hour per second

4 a02_1Dkinem_equations

1. A car is accelerating uniformly at an acceleration of 4.25m/s/s. At x = 7.25m, the speed is 3.7m/s. How fast is it moving at x = 12.25 m?[36]

   A. 7.5 m/s.

   B. 9 m/s.

   C. 10.79 m/s.

   D. 12.95 m/s.

   E. 15.54 m/s.

2. What is the acceleration if a car travelling at 10.8 m/s makes a skid mark that is 6.5 m long before coming to rest? (Assume uniform acceleration.)[37]

   A. 5.19m/s^2.

   B. 6.23m/s^2.

   C. 7.48m/s^2.

   D. 8.97m/s^2.

   E. 10.77m/s^2.

3. A train accelerates uniformly from 16 m/s to 33 m/s, while travelling a distance of 485 m. What is the 'average' acceleration?[38]

   A. 0.86m/s/s.

   B. 1.03m/s/s.

   C. 1.24m/s/s.

   D. 1.48m/s/s.

   E. 1.78m/s/s.

4. A particle accelerates uniformly at 11.25 m/s/s. How long does it take for the velocity to increase from 932 m/s to 1815 m/s?[39]

   A. 45.42 s

   B. 54.51 s

   C. 65.41 s

   D. 78.49 s

   E. 94.19 s

5 a03_2Dkinem_2dmotion

1. A ball is kicked horizontally from a height of 2.3 m, at a speed of 7.8m/s. How far does it travel before landing?[40]

   A. 3.09 m.

   B. 3.71 m.

   C. 4.45 m.

   D. 5.34 m.

   E. 6.41 m.

2. A particle is initially at the origin and moving in the x direction at a speed of 3.7 m/s. It has an constant acceleration of 2.3 m/s^2 in the y direction, as well as an acceleration of 0.5 in the x direction. What angle does the velocity make with the x axis at time t = 2.8 s?[41]

   A. 51.62 degrees.

   B. 59.37 degrees.

   C. 68.27 degrees.

   D. 78.51 degrees.

   E. 90.29 degrees.

3. At time, t=0, two particles are on the x axis. Particle A is (initially) at the origin and moves at a constant speed of 7.29 m/s at an angle of θ above the x-axis. Particle B is initially situated at x= 2.75 m, and moves at a constant speed of 2.98 m/s in the +y direction. At what time do they meet?[42]

   A. 0.24 s.

   B. 0.29 s.

   C. 0.34 s.

   D. 0.41 s.

   E. 0.5 s.

4. At time, t=0, two particles are on the x axis. Particle A is (initially) at the origin and moves at a constant speed of 7.17 m/s at an angle of θ above the x-axis. Particle B is initially situated at x= 2.04 m, and moves at a constant speed of 2.52 m/s in the +y direction. What is the value of θ (in radians)?[43]

   A. 0.27 radians.

   B. 0.31 radians.

   C. 0.36 radians.

   D. 0.41 radians.

   E. 0.47 radians.

The next page might contain more answer choices for this question

6 a03_2Dkinem_smithtrain

1. The Smith family is having fun on a high speed train travelling at 49.8 m/s. Mr. Smith is at the back of the train and fires a pellet gun with a muzzle speed of 22.4 m/s at Mrs. Smith who is at the front of the train. What is the speed of the bullet with respect to Earth?[44]

    A. 14.3 m/s.

    B. 21.4 m/s.

    C. 32.1 m/s.

    D. 48.1 m/s.

    E. 72.2 m/s.

2. The Smith family is having fun on a high speed train travelling at 49.8 m/s. Mrs. Smith, who is at the front of the train, fires straight towards the back with a bullet that is going forward with respect to Earth at a speed of 26.4 m/s. What was the muzzle speed of her bullet?[45]

    A. 15.6 m/s.

    B. 23.4 m/s.

    C. 35.1 m/s.

    D. 52.7 m/s.

    E. 79 m/s.

3. The Smith family is having fun on a high speed train travelling at 49.8 m/s. The daugher fires at Mr. Smith with a pellet gun whose muzzle speed is 29.2 m/s. She was situated across the isle, perpendicular to the length of the train. What is the speed of her bullet with respect to Earth?[46]

    A. 17.1 m/s.

    B. 25.7 m/s.

    C. 38.5 m/s.

    D. 57.7 m/s.

    E. 86.6 m/s.

4. The Smith family got in trouble for having fun on a high speed train travelling at 49.8 m/s. Mr. Smith is charged with having fired a pellet gun at his daughter (directly across the isle) with a bullet that had a speed of 91.8 m/s with respect to Earth. How fast was the bullet going relative to the daughter (i.e. train)?[47]

    A. 64.3 m/s.

    B. 77.1 m/s.

    C. 92.5 m/s.

    D. 111.1 m/s.

    E. 133.3 m/s.

7 a04DynForce Newton_forces

1. A mass with weight (mg) of 44 newtons is suspended symmetrically from two strings. The angle between the two strings (i.e. where they are attached to the mass) is 60 degrees. What is the tension in the string?[48]

    A. 16.7 N.

    B. 19.2 N.

The next page might contain more answer choices for this question

C. 22.1 N.

D. 25.4 N.

E. 29.2 N.

2. A mass with weight (mg) equal to 25 newtons is suspended symmetrically from two strings. Each string makes the (same) angle of 69 degrees with respect to the horizontal. What is the tension in each string?[49]

A. 10.1 N.

B. 11.6 N.

C. 13.4 N.

D. 15.4 N.

E. 17.7 N.

3. A 4.5 kg mass is sliding along a surface that has a kinetic coefficient of friction equal to 0.37 . In addition to the surface friction, there is also an air drag equal to 29 N. What is the magnitude (absolute value) of the acceleration?[50]

A. 5.8 m/s^2.

B. 6.6 m/s^2.

C. 7.6 m/s^2.

D. 8.8 m/s^2.

E. 10.1 m/s^2.

4. A mass with weight (mg) 7.3 newtons is on a horzontal surface. It is being pulled on by a string at an angle of 30 degrees above the horizontal, with a force equal to 3.94 newtons. If this is the maximum force before the block starts to move, what is the static coefficient of friction? [51]

A. 0.37

B. 0.44

C. 0.53

D. 0.64

E. 0.77

8 a04DynForce Newton_sled

1. A sled of mass 5.4 kg is at rest on a rough surface. A string pulls with a tension of 43.4N at an angle of 31 degrees above the horizontal. What is the magnitude of the friction?[52]

A. 24.46 N.

B. 28.13 N.

C. 32.35 N.

D. 37.2 N.

E. 42.78 N.

2. A sled of mass 5.3 kg is at rest on a rough surface. A string pulls with a tension of 44.9N at an angle of 57 degrees above the horizontal. What is the normal force?[53]

A. 8.17 N.

B. 9.39 N.

The next page might contain more answer choices for this question

C. 10.8 N.

D. 12.42 N.

E. 14.28 N.

3. A sled of mass 5.9 kg is at rest on a perfectly smooth surface. A string pulls with a tension of 47.3N at an angle of 48 degrees above the horizontal. How long will it take to reach a speed of 10.8 m/s?[54]

A. 1.15 s

B. 1.32 s

C. 1.52 s

D. 1.75 s

E. 2.01 s

4. A sled of mass 2.1 kg is on perfectly smooth surface. A string pulls with a tension of 17.5N. At what angle above the horizontal must the string pull in order to achieve an accelerations of 2.8 m/s^2?[55]

A. 70.4 degrees

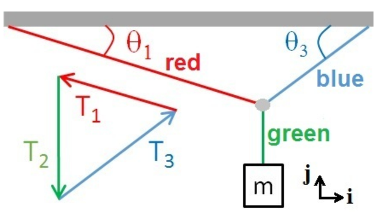
B. 80.9 degrees

C. 93.1 degrees

D. 107 degrees

E. 123.1 degrees

9 a04DynForce Newton_tensions

1. 

In the figure shown, θ_1 is 18 degrees, and θ_3 is 34 degrees. The tension T_3 is 24 N. What is the tension, T_1? [56]

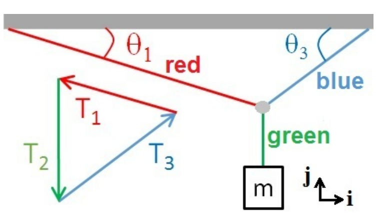
A. 15.82 N.

B. 18.19 N.

C. 20.92 N.

D. 24.06 N.

E. 27.67 N.

2. 

In the figure shown, θ_1 is 18 degrees, and θ_3 is 34 degrees. The tension T_3 is 24 N. What is the weight?[57]

A. 13.1 N.

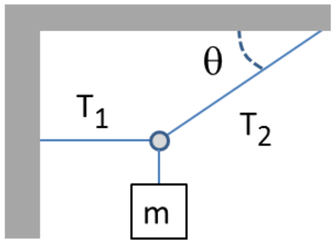
B. 15 N.

C. 17.3 N.

The next page might contain more answer choices for this question

D. 19.9 N.

E. 22.9 N.

3. 

In the figure shown, θ is 35 degrees, and the mass is 3.8 kg. What is T_2? [58]

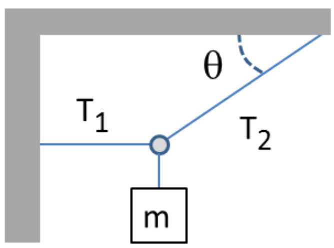
A. 56.46 N.

B. 64.93 N.

C. 74.66 N.

D. 85.86 N.

E. 98.74 N.

4. 

In the figure shown, θ is 35 degrees, and the mass is 3.8 kg. What is T_1?[59]

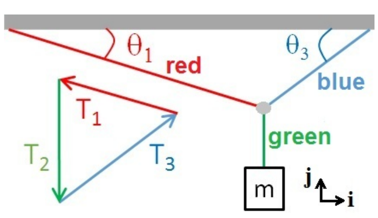
A. 30.8 N.

B. 36.9 N.

C. 44.3 N.

D. 53.2 N.

E. 63.8 N.

5. 

In the figure shown, θ_1 is 15 degrees , and θ_3 is 40 degrees . The mass has a 'weight' of 26 N. What is the tension, T_1? [60]

A. 15.99 N.

B. 18.39 N.

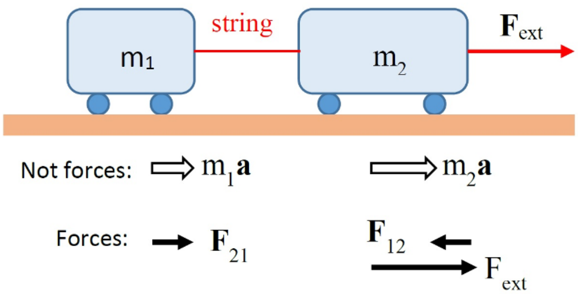
C. 21.14 N.

D. 24.31 N.

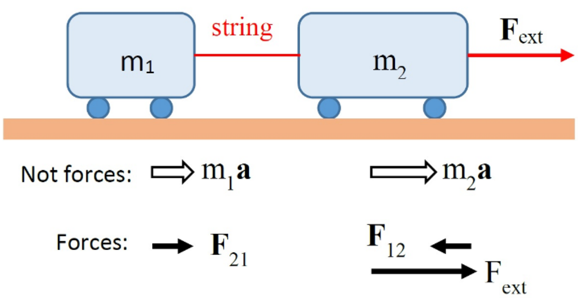
E. 27.96 N.

The next page might contain more answer choices for this question

10 a05frictDragElast_3rdLaw



1. In the figure shown above, the mass of m_1 is 5.4 kg, and the mass of m_2 is 3.2 kg. If the external force, F_{ext} on m_2 is 104 N, what is the tension in the connecting string? Assume no friction is present.[61]
   - A. 56.8 N
   - **B. 65.3 N**
   - C. 75.1 N
   - D. 86.4 N
   - E. 99.3 N



2. In the figure shown above (with $m_1 = 5.4$ kg, $m_2 = 3.2$ kg, and $F_{ext} = 104$ N), what is the acceleration? Assume no friction is present. [62]
   - A. 9.1 m/s^2
   - B. 10.5 m/s^2
   - **C. 12.1 m/s^2**
   - D. 13.9 m/s^2
   - E. 16 m/s^2

3. Nine barefoot baseball players, with a total mass of 647 kg plays tug of war against five basketball players wearing shoes that provide a static coefficient of friction of 0.58 . The net mass of the (shoed) basketball team is 392 kg. What is the maximum coefficient of the barefoot boys if they lose?[63]
   - **A. 0.351**
   - B. 0.387
   - C. 0.425
   - D. 0.468
   - E. 0.514

4. Without their shoes, members of a 9 person baseball team have a coefficient of static friction of only 0.23 . But the team wins a game of tug of war due to their superior mass of 638 kg. They are playing against a 5 person

basketball team with a net mass of 415 kg. What is the maximum coefficient of static friction of the basketball team? [64]

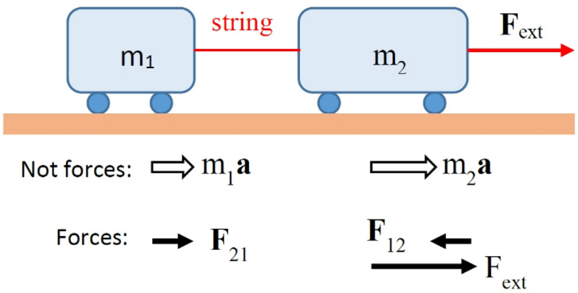
A. 0.321

B. 0.354

C. 0.389

D. 0.428

E. 0.471



5. In the figure shown above, the mass of m_1 is 6.6 kg, and the mass of m_2 is 2.6 kg. If the external force, F_{ext} on m_2 is 126 N, what is the tension in the connecting string? Assume that m_1 has a kinetic coefficient of friction equal to 0.37, and that for m_2 the coefficient is 0.44 .[65]

A. 67.4 N

B. 77.5 N

C. 89.1 N

D. 102.5 N

E. 117.9 N

11 a06uniformCircMotGravitation_friction

1. A merry-go-round has an angular frequency, ω, equal to 0.15 rad/sec. How many minutes does it take to complete 8.5 revolutions? [66]

A. 4.49 minutes.

B. 5.16 minutes.

C. 5.93 minutes.

D. 6.82 minutes.

E. 7.85 minutes.

2. A merry-go round has a period of 0.22 minutes. What is the centripetal force on a 81.2 kg person who is standing 1.64 meters from the center?[67]

A. 26.2 newtons.

B. 30.2 newtons.

C. 34.7 newtons.

D. 39.9 newtons.

E. 45.9 newtons.

3. A merry-go round has a period of 0.22 minutes. What is the minimum coefficient of static friction that would allow a 81.2 kg person to stand1.64 meters from the center, without grabbing something?[68]

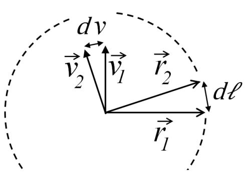
The next page might contain more answer choices for this question

A. 0.033
B. 0.038
C. 0.044
D. 0.05
E. 0.058

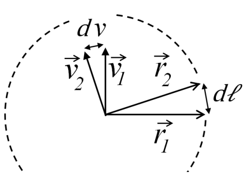
4. What is the gravitational acceleration on a plant that is 2.37 times more massive than Earth, and a radius that is 1.52 times greater than Earths?[69]
   A. 10.1 m/s^2
   B. 11.6 m/s^2
   C. 13.3 m/s^2
   D. 15.3 m/s^2
   E. 17.6 m/s^2

5. What is the gravitational acceleration on a plant that is 2.89 times more dense than Earth, and a radius that is 2.38 times greater than Earth's?[70]
   A. 58.6 m/s^2
   B. 67.4 m/s^2
   C. 77.5 m/s^2
   D. 89.1 m/s^2
   E. 102.5 m/s^2

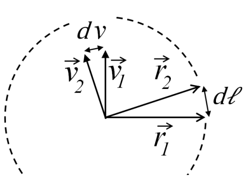
12 a06uniformCircMotGravitation_proof

1. 

Is $dv/d\ell = v/r$ valid for uniform circular motion? [71]
   A. Yes
   B. No

2. 

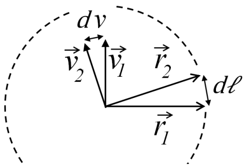
Is $dv/r = d\ell/v$ valid for uniform circular motion? [72]
   A. Yes
   B. No

3. 

Is $rd\ell = vdv$ valid for uniform circular motion? [73]
   A. Yes

The next page might contain more answer choices for this question

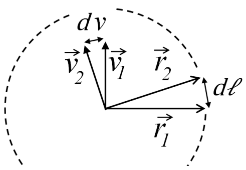
B. No

4. 

Is $dv = |\vec{v}_2| - |\vec{v}_1|$ valid for uniform circular motion? [74]

A. Yes

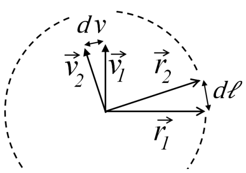
B. No

5. 

Is $d\ell/dv = v/r$ valid for uniform circular motion? [75]

A. Yes

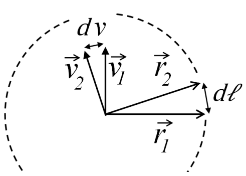
B. No

6. 

Is $dv/d\ell = r/v$ valid for uniform circular motion? [76]

A. Yes

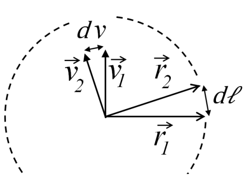
B. No

7. 

Is $dv = |\vec{v}_2 - \vec{v}_1|$ valid for uniform circular motion? [77]

A. Yes

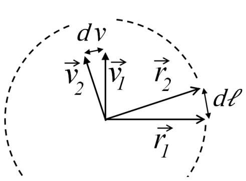
B. No

8. 

Is $d\ell = vdt$ valid for uniform circular motion? [78]

A. Yes

B. No

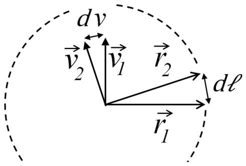
9. 

Is $adt/v = vdt/r$ valid for uniform circular motion? [79]

A. Yes

B. No

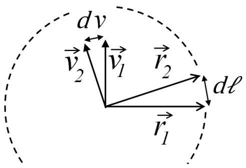
The next page might contain more answer choices for this question

10. 

Is $dv = adt$ valid for uniform circular motion? [80]

A. Yes

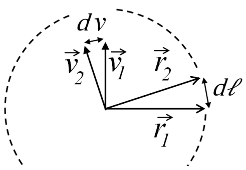
B. No

11. 

Is $|d\vec{v}| = adt$ valid for uniform circular motion? [81]

A. Yes

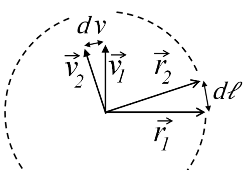
B. No

12. 

Is $d\ell = |\vec{r}_2 - \vec{r}_1|$ valid for uniform circular motion? [82]

A. Yes

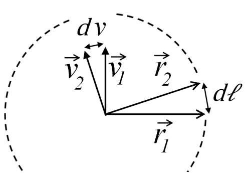
B. No

13. 

Is $d\ell = |\vec{r}_2| - |\vec{r}_1|$ valid for uniform circular motion? [83]

A. Yes

B. No

14. 

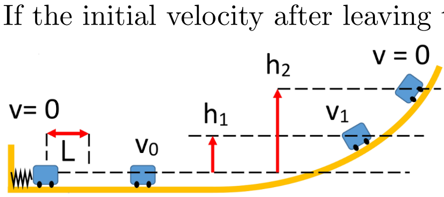
Is $v/d\ell = r/dv$ valid for uniform circular motion? [84]

A. Yes

B. No

13 a07energy_cart1

1. If the initial velocity after leaving the spring is 5.00 m/s, how high does it reach before coming to rest?



[85]

A.) 1.10 m

The next page might contain more answer choices for this question

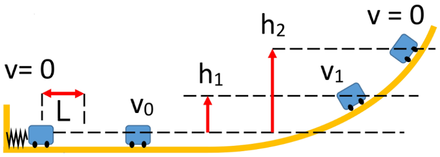
B.) 1.16 m

C.) 1.21 m

D.) 1.28 m

E.) 1.34 m

2. The mass of the cart is 2.0kg, and the spring constant is 5447N/m. If the initial compression of the spring is 0.10m, how high does it reach before coming to rest?



[86]

A.) 1.32E+00 m

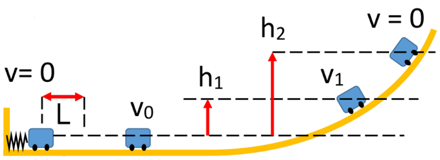
B.) 1.39E+00 m

C.) 1.46E+00 m

D.) 1.53E+00 m

E.) 1.61E+00 m

3. What is the highest point the cart reaches if the speed was 1.4m/s, when the cart was situated at a height of 2.2m?,



[87]

A.) 2.00 m

B.) 2.10 m

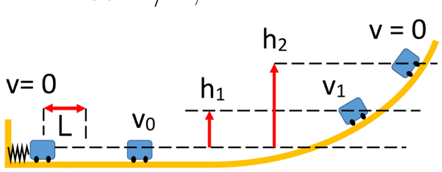
C.) 2.20 m

D.) 2.31 m

E.) 2.43 m

14 a07energy_cart2

1. The spring constant is 561N/m, and the initial compression is 0.12m. What is the mass if the cart reaches a height of 1.38m,



before coming to rest?[88]

A.) 0.271 kg

B.) 0.284 kg

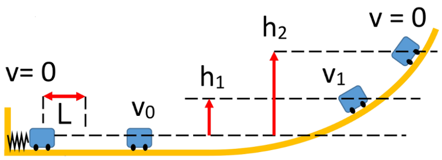
C.) 0.299 kg

D.) 0.314 kg

E.) 0.329 kg

The next page might contain more answer choices for this question

2. The cart has a mass of 3.03kg. It is moving at a speed of 2.10m/s, when it is at a height of 2.45m. If the spring constant was 572N/m, what was the initial compression?



89

A.) 0.43 m
B.) 0.46 m
C.) 0.49 m
D.) 0.53 m
E.) 0.56 m

3. You are riding a bicycle on a flat road. Assume no friction or air drag, and that you are coasting. Your speed is 4.9m/s, when you encounter a hill of height 1.14m. What is your speed at the top of the hill?[90]

A.) 1.149 m/s
B.) 1.218 m/s
C.) 1.291 m/s
D.) 1.368 m/s
E.) 1.450 m/s

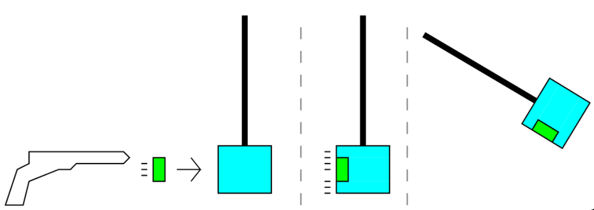
15 a08linearMomentumCollisions

1. On object of mass 2.8 kg that is moving at a velocity of 23m/s collides with a stationary object of mass 20.47 kg. What is the final velocity if they stick? (Assume no external friction.)[91]

A. 2.31m/s.
B. 2.77m/s.
C. 3.32m/s.
D. 3.99m/s.
E. 4.78m/s.

2. A car of mass 637 kg is driving on an icy road at a speed of 22 m/s, when it collides with a stationary truck. After the collision they stick and move at a speed of 7.7 m/s. What was the mass of the truck?[92]

A. 822
B. 986
C. 1183
D. 1420
E. 1704

3. 
A 167 gm bullet strikes a ballistic pendulum of mass 2.1 kg (before the bullet struck). After impact, the pendulum rises by 65 cm. What was the speed of the bullet?[93]

The next page might contain more answer choices for this question

A. 37 m/s.

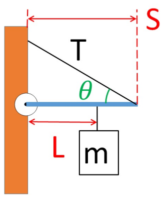
B. 40 m/s.

C. 42 m/s.

D. 45 m/s.

E. 48 m/s.

16 a09staticsTorques_torque

1. 

A massless bar of length, S = 7.6m is attached to a wall by a frictionless hinge (shown as a circle). The bar is held horizontal by a string that makes and angle θ = 37.4 degrees above the horizontal. An object of mass, M = 6kg is suspended at a length, L = 5.4m from the wall. What is the tension, T, in the string?[94]

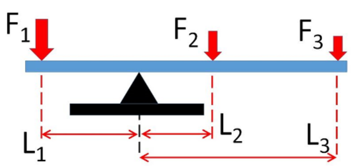
   A. 3.45E+01 N

   B. 4.34E+01 N

   C. 5.46E+01 N

   D. 6.88E+01 N

   E. 8.66E+01 N

2. 

In the figure shown, L_1 = 5.3m, L_2 = 4.3m and L_3 = 7.3m. What is F_1 if F_2 =3.6N and F_3 =5.1N?[95]

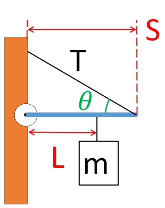
   A. 8.21E+00 N

   B. 9.95E+00 N

   C. 1.20E+01 N

   D. 1.46E+01 N

   E. 1.77E+01 N

3. 

A massless bar of length, S = 8.1m is attached to a wall by a frictionless hinge (shown as a circle). The bar is held horizontal by a string that makes and angle θ = 28.2 degrees above the horizontal. An object of mass, M = 9.2kg is suspended at a length, L = 5.7m from the wall. What is the x (horizontal) component of the force exerted by the wall on the horizontal bar?[96]

   A. 8.06E+01 N

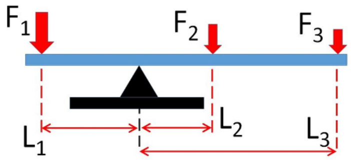
   B. 9.77E+01 N

   C. 1.18E+02 N

The next page might contain more answer choices for this question

D. 1.43E+02 N

E. 1.74E+02 N

4. 

In the figure shown, $L_1 = 6.5$m, $L_2 = 4.5$m and $L_3 = 7.8$m. What is F_2 if F_1 =0.56N and F_3 =0.4N?[97]

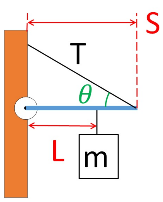
A. 6.50E-02 N

B. 7.87E-02 N

C. 9.54E-02 N

D. 1.16E-01 N

E. 1.40E-01 N

5. 

A massless bar of length, S = 9.5m is attached to a wall by a frictionless hinge (shown as a circle). The bar is held horizontal by a string that makes and angle θ = 26.5 degrees above the horizontal. An object of mass, M = 6.8kg is suspended at a length, L =6.6m from the wall. What is the y (vertical) component of the force exerted by the wall on the horizontal bar?[98]

A. 1.39E+01 N

B. 1.68E+01 N

C. 2.03E+01 N

D. 2.46E+01 N

E. 2.99E+01 N

17 a10rotationalMotionAngMom_dynamics

1. A car with a tire radius of 0.26 m accelerates from 0 to 36 m/s in 6.8 seconds. What is the angular acceleration of the wheel?[99]

A. 1.15 x 10^1 m

B. 1.39 x 10^1 m

C. 1.68 x 10^1 m

D. 2.04 x 10^1 m

E. 2.47 x 10^1 m

2. A lead filled bicycle wheel of radius 0.57 m and mass 2.2 kg is rotating at a frequency of 1.7 revolutions per second. What is the moment of inertia?[100]

A. 4.02 x 10^{-1} kg m^2/s^2

B. 4.87 x 10^{-1} kg m^2/s^2

C. 5.9 x 10^{-1} kg m^2/s^2

D. 7.15 x 10^{-1} kg m^2/s^2

The next page might contain more answer choices for this question

E. 8.66×10^{-1} kg m^2/s^2

3. A lead filled bicycle wheel of radius 0.57 m and mass 2.2 kg is rotating at a frequency of 1.7 revolutions per second. What is the total kinetic energy if the wheel is rotating about a stationary axis?[101]

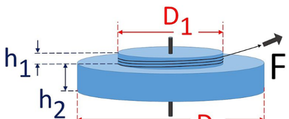
A. 1.99×10^1 J

B. 2.29×10^1 J

C. 2.76×10^1 J

D. 3.43×10^1 J

E. 4.08×10^1 J

4. 

The moment of inertia of a solid disk of mass, M, and radius, R, is $\frac{1}{2}MR^2$. Two identical disks, each with mass 3.8 kg are attached. The larger disk has a diameter of 0.9 m, and the smaller disk has a diameter of 0.46 m. If a force of 76 N is applied at the rim of the smaller disk, what is the angular acceleration?[102]

A. 2.03×10^1 s^{-2}

B. 2.45×10^1 s^{-2}

C. 2.97×10^1 s^{-2}

D. 3.6×10^1 s^{-2}

E. 4.36×10^1 s^{-2}

18 a11fluidStatics_buoyantForce

1. A cylinder with a radius of 0.22 m and a length of 2.2 m is held so that the top circular face is 4.8 m below the water. The mass of the block is 826.0 kg. The mass density of water is 1000kg/m^3. What is the pressure at the top face of the cylinder?[103]

A. .20E4 Pa

B. .88E4 Pa

C. .70E4 Pa

D. .70E4 Pa

E. .90E4 Pa

2. A cylinder with a radius of 0.22 m and a length of 2.2 m is held so that the top circular face is 4.8 m below the water. The mass of the block is 826.0 kg. The mass density of water is 1000kg/m^3. What is the buoyant force?[104]

A. .71E3 N

B. .28E3 N

C. .97E3 N

D. .81E3 N

E. .83E3 N

3. A cylinder with a radius of 0.22 m and a length of 2.2 m is held so that the top circular face is 4.8 m below the water. The mass of the block is 826.0 kg. The mass density of water is 1000kg/m^3. What is the force exerted by the water at the top surface?[105]

A. .15E3 N

The next page might contain more answer choices for this question

B. .00E3 N

C. .13E4 N

D. .43E4 N

E. .80E4 N

4. A cylinder with a radius of 0.22 m and a length of 2.2 m is held so that the top circular face is 4.8 m below the water. The mass of the block is 826.0 kg. The mass density of water is 1000kg/m^3. What,what is the force exerted by the fluid on the bottom of the cylinder?[106]

A. .04E4 Pa

B. .31E4 Pa

C. .65E4 Pa

D. .08E4 Pa

E. .62E4 Pa

19 a12fluidDynamics_pipeDiameter

1. A 8.3 cm diameter pipe can fill a 1.7 m^3 volume in 6.0 minutes. Before exiting the pipe, the diameter is reduced to 3.0 cm (with no loss of flow rate). What is the speed in the first (wider) pipe?[107]

A. 7.20E-1 m/s

B. 8.73E-1 m/s

C. 1.06E0 m/s

D. 1.28E0 m/s

E. 1.55E0 m/s

2. A 8.3 cm diameter pipe can fill a 1.7 m^3 volume in 6.0 minutes. Before exiting the pipe, the diameter is reduced to 3.0 cm (with no loss of flow rate). What is the pressure difference (in Pascals) between the two regions of the pipe?[108]

A. 1.81E4

B. 2.19E4

C. 2.66E4

D. 3.22E4

E. 3.90E4

3. A 8.3 cm diameter pipe can fill a 1.7 m^3 volume in 6.0 minutes. Before exiting the pipe, the diameter is reduced to 3.0 cm (with no loss of flow rate). If two fluid elements at the center of the pipe are separated by 19.0 mm when they are both in the wide pipe, and we neglect turbulence, what is the separation when both are in the narrow pipe?[109]

A. 1.45E2 mm

B. 1.76E2 mm

C. 2.13E2 mm

D. 2.59E2 mm

E. 3.13E2 mm

The next page might contain more answer choices for this question

4. A large cylinder is filled with water so that the bottom is 7.8 m below the waterline. At the bottom is a small hole with a diameter of 5.4E-4 m. How fast is the water flowing at the hole? (Neglect viscous effects, turbulence, and also assume that the hole is so small that no significant motion occurs at the top of the cylinder.)[110]

   A. 8.42E0 m/s

   B. 1.02E1 m/s

   C. 1.24E1 m/s

   D. 1.50E1 m/s

   E. 1.81E1 m/s

20 a13TemperatureKineticTheoGasLaw

1. What is the root-mean-square of 27, 4, and -39?[111]

   A. 1.734 x 10^1

   B. 1.946 x 10^1

   C. 2.183 x 10^1

   D. 2.449 x 10^1

   E. 2.748 x 10^1

2. What is the rms speed of a molecule with an atomic mass of 9 if the temperature is 60 degrees Fahrenheit?[112]

   A. 5.03 x 10^2 m/s

   B. 6.09 x 10^2 m/s

   C. 7.38 x 10^2 m/s

   D. 8.95 x 10^2 m/s

   E. 1.08 x 10^3 m/s

3. If a molecule with atomic mass equal to 7 amu has a speed of 289 m/s, what is the speed at an atom in the same atmosphere of a molecule with an atomic mass of 22 ?[113]

   A. 1.11 x 10^2 m/s

   B. 1.35 x 10^2 m/s

   C. 1.63 x 10^2 m/s

   D. 1.98 x 10^2 m/s

   E. 2.39 x 10^2 m/s

21 a14HeatTransfer_specifHeatConduct

1. The specific heat of water and aluminum are 4186 and 900, respectively, where the units are J/kg/Celsius. An aluminum container of mass 0.98 kg is filled with 0.23 kg of water. How much heat does it take to raise both from 39.7 C to 88 C? [114]

   A. 8.91 x 10^4 J

   B. 1.05 x 10^5 J

   C. 1.24 x 10^5 J

   D. 1.46 x 10^5 J

   E. 1.72 x 10^5 J

The next page might contain more answer choices for this question

2. The specific heat of water and aluminum are 4186 and 900, respectively, where the units are J/kg/Celsius. An aluminum container of mass 0.98 kg is filled with 0.23 kg of water. What fraction of the heat went into the aluminum? [115]

   A. 2.9 x 10^{-1}
   B. 3.4 x 10^{-1}
   C. 4.1 x 10^{-1}
   D. 4.8 x 10^{-1}
   E. 5.6 x 10^{-1}

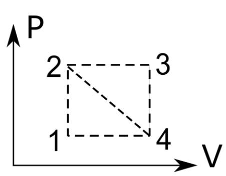
3. The specific heat of water and aluminum are 4186 and 900, respectively, where the units are J/kg/Celsius. An aluminum container of mass 0.98 kg is filled with 0.23 kg of water. You are consulting for the flat earth society, a group of people who believe that the acceleration of gravity equals 9.8 m/s/s at all altitudes. Based on this assumption, from what height must the water and container be dropped to achieve the same change in temperature? (For comparison, Earth's radius is 6,371 kilometers) [116]

   A. 5.12 x 10^{0} km
   B. 6.2 x 10^{0} km
   C. 7.51 x 10^{0} km
   D. 9.1 x 10^{0} km
   E. 1.1 x 10^{1} km

4. A window is square, with a length of each side equal to 0.86 meters. The glass has a thickness of 14 mm. To decrease the heat loss, you reduce the size of the window by decreasing the length of each side by a factor of 1.46. You also increase the thickness of the glass by a factor of 2.31. If the inside and outside temperatures are unchanged, by what factor have you decreased the heat flow?. By what factor have you decreased the heat flow (assuming the same inside and outside temperatures).[117]

   A. 4.06 x 10^{0} unit
   B. 4.92 x 10^{0} unit
   C. 5.97 x 10^{0} unit
   D. 7.23 x 10^{0} unit
   E. 8.76 x 10^{0} unit

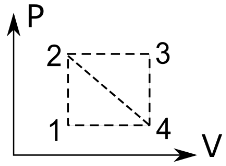
22 a15Thermodynamics_heatEngine



1. A 1241 heat cycle uses 2.8 moles of an ideal gas. The pressures and volumes are: P_1= 1.4 kPa, P_2= 2.8 kPa. The volumes are V_1= 2.8m^3 and V_4= 5.1m^3. How much work is done in in one cycle?[118]

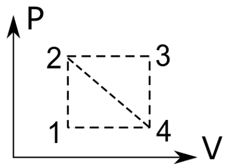
   A. 5.09 x 10^{2} J
   B. 1.61 x 10^{3} J
   C. 5.09 x 10^{3} J
   D. 1.61 x 10^{4} J
   E. 5.09 x 10^{4} J

The next page might contain more answer choices for this question



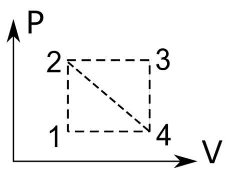
2. A 1241 heat cycle uses 2.6 moles of an ideal gas. The pressures and volumes are: P_1= 3 kPa, P_2= 5.9 kPa. The volumes are V_1= 2.5m^3 and V_4= 3.6m^3. How much work is involved between 1 and 4?[119]

   A. 3.3 x 10^2 J
   B. 1.04 x 10^3 J
   C. 3.3 x 10^3 J
   D. 1.04 x 10^4 J
   E. 3.3 x 10^4 J



3. A 1241 heat cycle uses 2.1 moles of an ideal gas. The pressures and volumes are: P_1= 1.2 kPa, P_2= 4.1 kPa. The volumes are V_1= 3.1m^3 and V_4= 4.3m^3. How much work is involved between 2 and 4?[120]

   A. 1.01 x 10^3 J
   B. 3.18 x 10^3 J
   C. 1.01 x 10^4 J
   D. 3.18 x 10^4 J
   E. 1.01 x 10^5 J



4. A 1241 heat cycle uses 1.4 moles of an ideal gas. The pressures and volumes are: P_1= 2.2 kPa, P_2= 4 kPa. The volumes are V_1= 1.4m^3 and V_4= 3.3m^3. What is the temperature at step 4?[121]

   A. 1.97 x 10^2 K
   B. 6.24 x 10^2 K
   C. 1.97 x 10^3 K
   D. 6.24 x 10^3 K
   E. 1.97 x 10^4 K

23 a16OscillationsWaves_amplitudes

1. A 0.156 kg mass is on a spring that causes the frequency of oscillation to be 95 cycles per second. The maximum velocity is 50.6 m/s. What is the maximum force on the mass?[122]

   A. 2.2 x 10^3 N
   B. 4.7 x 10^3 N
   C. 1 x 10^4 N
   D. 2.2 x 10^4 N
   E. 4.7 x 10^4 N

The next page might contain more answer choices for this question

2. A spring with spring constant 5.5 kN/m is attached to a 9.8 gram mass. The maximum acelleration is 3.4 m/s^2. What is the maximum displacement?[123]
   - A. 1.92 x 10^{-7} m
   - B. 6.06 x 10^{-7} m
   - C. 1.92 x 10^{-6} m
   - **D. 6.06 x 10^{-6} m**
   - E. 1.92 x 10^{-5} m

3. A spring of spring constant 9.1 kN/m causes a mass to move with a period of 6.5 ms. The maximum displacement is 8.1 mm. What is the maximum kinetic energy?[124]
   - A. 9.44 x 10^{-3} J
   - B. 2.99 x 10^{-2} J
   - C. 9.44 x 10^{-2} J
   - **D. 2.99 x 10^{-1} J**
   - E. 9.44 x 10^{-1} J

4. A spring with spring constant 3.1 kN/m undergoes simple harmonic motion with a frequency of 2.9 kHz. The maximum force is 2.3 N. What is the total energy?[125]
   - A. 2.7 x 10^{-4} J
   - **B. 8.53 x 10^{-4} J**
   - C. 2.7 x 10^{-3} J
   - D. 8.53 x 10^{-3} J
   - E. 2.7 x 10^{-2} J

24 a17PhysHearing_echoString

1. The temperature is -2 degrees Celsius, and you are standing 0.88 km from a cliff. What is the echo time?[126]
   - A. 4.238 x 10^{0} seconds
   - B. 4.576 x 10^{0} seconds
   - C. 4.941 x 10^{0} seconds
   - **D. 5.335 x 10^{0} seconds**
   - E. 5.761 x 10^{0} seconds

2. While standing 0.88 km from a cliff, you measure the echo time to be 5.069 seconds. What is the temperature?[127]
   - **A. 2.72 x 10^{1}Celsius**
   - B. 3.15 x 10^{1}Celsius
   - C. 3.63 x 10^{1}Celsius
   - D. 4.19 x 10^{1}Celsius
   - E. 4.84 x 10^{1}Celsius

3. What is the speed of a transverse wave on a string if the string is 1.11 m long, clamped at both ends, and harmonic number 4 has a frequency of 611 Hz?[128]
   - A. 1.57 x 10^{2} unit

The next page might contain more answer choices for this question

B. 1.91 x 10^2 unit

C. 2.31 x 10^2 unit

D. 2.8 x 10^2 unit

E. 3.39 x 10^2 unit

25 AstroAtmosphericLoss

1. It is important to distinguish between molecules (collectively) in a gas and one individual molecule. This question is about an individual molecule. For a planet with a given mass, size, and density, which has the greater escape velocity? [129]

   A. the heavier molecule has the greater escape velocity

   B. the lighter molecule has the greater escape velocity

   C. all molecules have the same escape velocity

   D. no molecules have escape velocity

   E. all molecules move at the escape velocity

2. It is important to distinguish between molecules (collectively) in a gas and one individual molecule. This question is about a typical molecule in the gas. For a planet with a given mass, size, and density, which type of gas is more likely to escape? [130]

   A. atoms in a hotter gas is more likely to escape

   B. atoms in a denser gas are more likely to escape

   C. atoms in a gas with more atomic mass are more likely to escape

   D. all types of gas are equally likely to escape

   E. atoms in a colder gas are more likely to escape

3. Which type of gas is likely to have the faster particles?[131]

   A. a hot gas with low mass atoms

   B. a hot gas with high mass atoms

   C. a cold gas with low mass atoms

   D. a cold gas with high mass atoms

   E. all gasses on a given planet have the same speed

4. What is it about the isotopes of Argon-36 and Argon-38 that causes their relative abundance to be so unusual on Mars?[132]

   A. different half-life

   B. different speed

   C. different chemical properties

   D. identical mass

   E. identical abundance

5. In the formula, $\frac{1}{2}m_{\text{atom}}v_{\text{escape}}^2 = G_{\text{Newton}}\frac{M_{\text{planet}}m_{\text{atom}}}{r_{\text{planet}}}$, which of the following is FALSE?[133]

   A. v_{escape} is independent of m_{atom}

   B. the formula is valid for all launch angles

The next page might contain more answer choices for this question

C. the formula is valid only if the particle is launched from the surface of planet of radius r_{planet}

D. the formula can be used to estimate how fast an atom must move before exiting the planet

E. the particle is assumed to have been launched vertically

6. What statement is FALSE about $\frac{1}{2}m_{\rm atom}\langle v_{\rm atom}^2\rangle_{ave} = \frac{1}{2}k_{\rm B}T$?[134]

   A. The kinetic energy is directly proportional to temperature.

   B. The average speed of a low mass particle is higher than the average speed of a high mass particle

   C. Temperature is measured in Kelvins

   D. Temperature is measured in Centigrades

   E. This equation does not involve the size or mass of the planet.

7. $\frac{1}{2}m_{\rm atom}\langle v_{\rm atom}^2\rangle_{ave} = \frac{1}{2}k_{\rm B}T$, where "T" is temperature on the Kelvin scale. This formula describes:[135]

   A. The speed an atom needs to escape the planet, where m is the mass of the atom.

   B. The speed of a typical atom, where m is the mass of the atom.

   C. The the speed an atom needs to escape the planet, where m is the mass planet.

   D. The speed of a typical atom, where m is the mass of the planet.

   E. The speed an atom needs to orbit the planet, where m is the mass of the atom.

26 AstroPluto and planetary mass

1. Which of the following is NOT used to measure the mass of a planet[136]

   A. the rotation of the planet about its axis

   B. the motion of an artificial satellite

   C. the motion of a moon

   D. the motion of a neighboring planet

   E. all of these have been used

2. What is unusual about calculations of the mass of Pluto made in the early part of the 20th century?[137]

   A. The estimates were correct to within less than 10

   B. The estimates were too low. Pluto was actually more massive than they thought.

   C. The estimates were high. Pluto was less massive than they calculated

   D. It was the first time a moon was used to calculate the mass of a planet

   E. It was the first time a planet's period of orbit around the sun was used to calculate the planet's mass

3. Why was the discovery of Pluto peculiar?[138]

   A. It was discovered during a survey looking for stars

   B. It was seen by Galileo, who thought it was a star

   C. It was discovered by a calculation based on flawed assumptions

   D. It was seen by Halley, who was looking for comets

   E. It was the first time a planet's period of orbit around the sun was used to calculate the planet's mass

4. Which of the following is NOT used to measure the mass of a planet[139]

   A. the motion of an artificial satellite

The next page might contain more answer choices for this question

B. the motion of a moon

C. the motion of a neighboring planet

D. all of these have been used

5. Which statement describes the relation between Pluto and Neptune[140]

A. Pluto's orbit lies outside Neptune's orbit

B. Pluto's orbit intersects Neptune's orbit an the two bodies will eventually collide

C. Pluto's orbit intersects Neptune's orbit but they avoid each other because Pluto's mass is too small

D. Pluto's orbit intersects Neptune's orbit but they don't collide because of an orbital resonance between the two

27 b_waves_PC

1. People don't usually perceive an echo when[141]

A. it arrives less than a tenth of a second after the original sound

B. it arrives at exactly the same pitch

C. it arrives at a higher pitch

D. it arrives at a lower pitch

E. it takes more than a tenth of a second after the original sound to arrive

2. Why do rough walls give a concert hall a fuller sound, compared to smooth walls?[142]

A. Rough walls make for a louder sound.

B. The difference in path lengths creates more reverberation.

C. The difference in path lengths creates more echo.

3. Comparing a typical church to a professional baseball stadium, the church is likely to have[143]

A. reverberation instead of echo

B. echo instead of reverberation

C. both reverberation and echo

D. neither reverberation nor echo

4. A dense rope is connected to a rope with less density (i.e. fewer kilograms per meter). If the rope is stretched and a wave is sent along high density rope towards the low density rope,[144]

A. the low density rope supports a wave with a higher frequency

B. the low density rope supports a wave with a lower frequency

C. the low density rope supports a wave with a higher speed

D. the low density rope supports a wave with a lower speed

5. A low density rope is connected to a rope with higher density (i.e. more kilograms per meter). If the rope is stretched and a wave is sent along the low density rope towards the high density rope,[145]

A. the high density rope supports a wave with a higher frequency

B. the high density rope supports a wave with a lower frequency

C. the high density rope supports a wave with a higher speed

D. the high density rope supports a wave with a lower speed

The next page might contain more answer choices for this question

6. What happens to the wavelength on a wave on a stretched string if the wave passes from lightweight (low density) region of the rope to a heavy (high density) rope?[146]

   A. the wavelength gets longer

   B. the wavelength stays the same

   C. the wavelength gets shorter

7. When a wave is reflected off a stationary barrier, the reflected wave[147]

   A. has lower amplitude than the incident wave

   B. has higher frequency than the incident wave

   C. both of these are true

8.  These two pulses will collide and produce[148]

   A. constructive interference

   B. destructive interference

   C. constructive diffraction

   D. destructive diffraction

9.  These two pulses will collide and produce[149]

   A. constructive interference

   B. destructive interference

   C. constructive diffraction

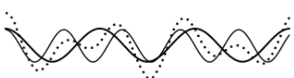
   D. destructive diffraction

10.  The two solid signals add to a (dashed)[150]

    A. octave

    B. fifth

    C. dissonance

11.  The two solid signals add to a (dashed)[151]

    A. octave

    B. fifth

    C. dissonance

12.  The two solid signals add to a (dashed)[152]

    A. octave

    B. fifth

    C. dissonance

13. Why don't we hear beats when two different notes on a piano are played at the same time?[153]

    A. The beats happen so many times per second you can't hear them.

    B. The note is over by the time the first beat is heard

The next page might contain more answer choices for this question

C. Reverberation usually stifles the beats

D. Echo usually stifles the beats

14. A tuning fork with a frequency of 440 Hz is played simultaneously with a tuning fork of 442 Hz. How many beats are heard in 10 seconds?[154]

A. 20

B. 30

C. 40

D. 50

E. 60

15. If you start moving towards a source of sound, the pitch[155]

A. becomes higher

B. becomes lower

C. remains unchanged

16. If a source of sound is moving towards you, the pitch [156]

A. becomes higher

B. becomes lower

C. remains unchanged

28 c07energy_lineIntegral

1. Integrate the line integral of, $\vec{F} = 9xy\hat{x} + 9.5y^3\hat{y}$, along the y axis from y = 5 to y = 14[157]

A.) 7.33E+04

B.) 7.84E+04

C.) 8.39E+04

D.) 8.98E+04

E.) 9.60E+04

2. Integrate the function, $\vec{F} = r^7\theta^9\hat{r} + r^7\theta^5\hat{\theta}$, along the first quadrant of a circle of radius 8[158]

A.) 3.43E+07

B.) 3.67E+07

C.) 3.93E+07

D.) 4.20E+07

E.) 4.49E+07

3. Integrate the line integral of $\vec{F} = 4xy\hat{x} + 7.7x\hat{y}$ from the origin to the point at x = 2.5 and y = 3.3[159]

A.) 5.93E+01

B.) 6.34E+01

C.) 6.78E+01

D.) 7.26E+01

E.) 7.77E+01

The next page might contain more answer choices for this question

4. Integrate the function, $\vec{F} = -x^2y^2\hat{x}+x^2y^3\hat{y}$, as a line integral around a unit square with corners at (0,0),(1,0),(1,1),(0,1). Orient the path so its direction is out of the paper by the right hand rule[160]

   A.) 4.45E-01
   B.) 4.76E-01
   C.) 5.10E-01
   D.) 5.45E-01
   E.) 5.83E-01

29 c16OscillationsWaves_calculus

1. If a particle's position is given by "x(t) = 7sin(3t-π/6)", what is the velocity?[161]

   A. "v(t) = 21sin(3t-π/6)"
   B. "v(t) = 7cos(3t-π/6)"
   C. "v(t) = 21cos(3t-π/6)"
   D. "v(t) = -21sin(3t-π/6)"
   E. "v(t) = -21cos(3t-π/6)"

2. If a particle's position is given by "x(t) = 7sin(3t-π/6)", what is the acceleration?[162]

   A. "a(t) = -63sin(3t-π/6)"
   B. "a(t) = +63sin(3t-π/6)"
   C. "a(t) = -21cos(3t-π/6)"
   D. "a(t) = -21sin(3t-π/6)"
   E. "a(t) = +21sin(3t-π/6)"

3. If a particle's position is given by "x(t) = 5cos(4t-π/6)", what is the velocity?[163]

   A. "v(t) = 5sin(4t-π/6)"
   B. "v(t) = -20sin(4t-π/6)"
   C. "v(t) = 20sin(4t-π/6)"
   D. "v(t) = -20cos(4t-π/6)"
   E. "v(t) = 20cos(4t-π/6)"

4. If a particle's position is given by "x(t) = 5sin(4t-π/6)", what is the velocity?[164]

   A. "v(t) = 20sin(4t-π/6)"
   B. "v(t) = 20cos(4t-π/6)"
   C. "v(t) = -20cos(4t-π/6)"
   D. "v(t) = 5cos(4t-π/6)"
   E. "v(t) = -20sin(4t-π/6)"

5. If a particle's position is given by "x(t) = 7cos(3t-π/6)", what is the velocity?[165]

   A. "v(t) = 7sin(3t-π/6)"
   B. "v(t) = -21cos(3t-π/6)"
   C. "v(t) = -21sin(3t-π/6)"
   D. "v(t) = 21sin(3t-π/6)"

The next page might contain more answer choices for this question

E. "v(t) = 21cos(3t-π/6)"

6. If a particle's position is given by "x(t) = 5sin(4t-π/6)", what is the acceleration?[166]

   A. "a(t) = -80sin(4t-π/6)"

   B. "a(t) = +80sin(4t-π/6)"

   C. "a(t) = -100cos(4t-π/6)"

   D. "a(t) = -100sin(4t-π/6)"

   E. "a(t) = +20sin(4t-π/6)"

30 Attribution

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