PracFinal 1st Semester Physics X

1. In general, all chemical reactions can be described as
   A. electron interactions
   B. nuclear reactions
   C. biological processes
   D. a more basic description doesn't exist

2. On a bicycle wheel, the radial direction is best indicated by the
   A. spokes B. rim C. axle

3. The quantity 86 μm can be written
   A. 86×10^{-12} m B. 86×10^{-9} m C. 86×10^{-6} m D. 86×10^{-3} m

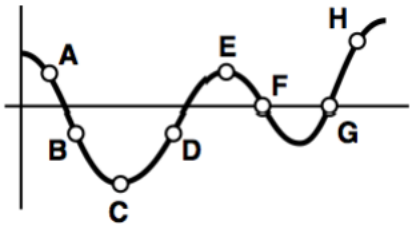
4. The length of an automobile (in meters) has an order of magnitude 10^n where n is
   A. -4 B. -2 C. 0 D. 2 E. 4

5. The length of a new pencil (in meters) has an order of magnitude 10^n where n is
   A. -3 B. -1 C. 1 D. 3 E. 5

6. The speedometer of a car indicates the car's
   A. instantaneous speed
   B. average speed
   C. instantaneous acceleration
   D. average acceleration

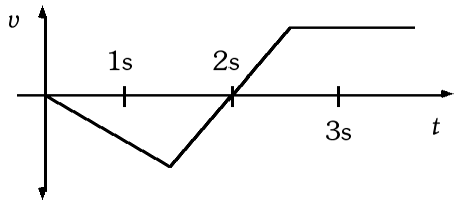
7. If acceleration is occurring, the speed of the object must be changing
   A. True B. False

Consider the conventional graph of position vs. time shown.



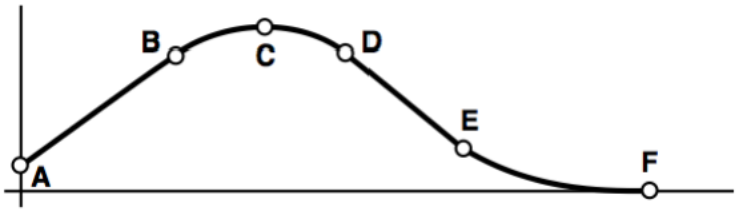
8. At point D,
   A. position is positive and velocity is positive
   B. position is positive and velocity is zero
   C. position is positive and velocity is negative
   D. position is zero and velocity is positive
   E. position is zero and velocity is negative
   F. position is negative and velocity is positive
   G. position is negative and velocity is zero
   H. position is negative and velocity is negative

Consider the conventional graph of velocity vs. time shown.



9. At which clock reading—if any—is the object at rest?
   A. 1s C. 3s E. 1s, 2s, and 3s
   B. 2s D. 1s and 3s F. None of these

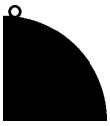
The following question(s) refer to the position vs. time graph shown below.



10. The object is undergoing an increase in speed throughout which segment?
    A. AB B. BC C. CD D. DE E. None

11. The object is undergoing a decrease in speed throughout which segment?
    A. AB B. BC C. CD D. DE E. None

Consider the hill shown to the right. A marble rolls down the hill.

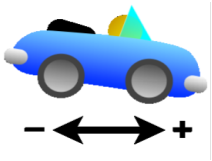


12. As the marble rolls down the incline,
    A. its speed increases and its acceleration increases
    B. its speed increases and its acceleration decreases
    C. its speed increases while its acceleration remains constant
    D. its speed decreases and its acceleration increases
    E. its speed decreases and its acceleration decreases
    F. its speed decreases while its acceleration remains constant

13. How far does an object travel if its speed is 4 m/s and it travels for 8 s?
    A. 0.25 m C. 2 m E. 16 m
    B. 0.5 m D. 4 m F. 32 m

14. A car moving at +15 m/s comes to a stop in 10 s. Its acceleration is
    A. $-0.67\ m/s^2$ B. $-1.5\ m/s^2$ C. $+0.67\ m/s^2$ D. $+1.5\ m/s^2$

15. The car in the diagram is moving forward (in "Drive') and slowing down. Relative to the coordinate system shown below the car, it has



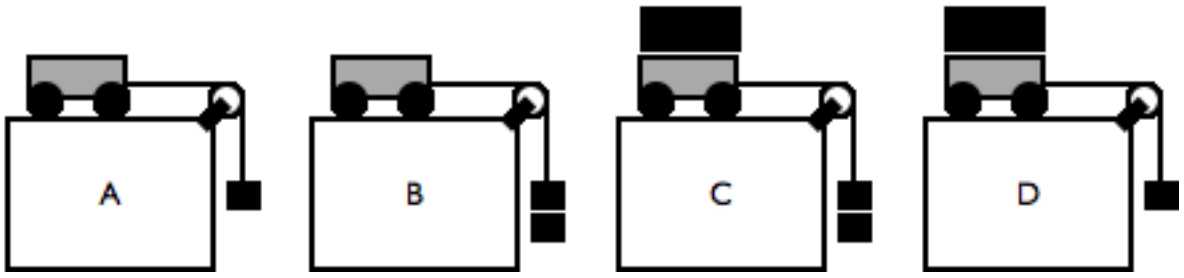
A. positive velocity
B. positive acceleration
C. both A and B
D. neither A nor B

16. Compared to pulling a tablecloth out from underneath a small stack of books without moving them much, it is _?_ to pull a tablecloth out from underneath a single sheet of paper without moving it much.
A. easier B. more difficult C. equally difficult

17. Neglect air resistance. A ball is thrown straight upward. At which point after being released is the magnitude of the net force acting on it equal to its weight?
A. On the way up
B. At the top of its flight
C. On the way back down
D. At all points
E. At no point

18. An object moves to the right with increasing acceleration to the right. We can therefore conclude
A. there is a force acting on it to the right
B. there is a constant net force acting to the right
C. there is an increasing net force acting to the right
D. the net force acting on it is zero

19. Carts are pulled along a track as shown. The hanging weights in B and C are double those in A and D. The cart masses in C and D are double those in A and B.



The acceleration is greatest in
A. A B. B C. C D. D

20. The acceleration of an object acted on by a non-zero net force is _?_ proportional to the mass of the object.
A. directly B. inversely C. in no way

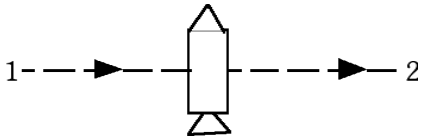
21. A certain force gives a 5 kg object an acceleration of 2 m/s^2. The same force would give a 20 kg object an acceleration of
A. 0.5 m/s^2 B. 1 m/s^2 C. 2 m/s^2 D. 8 m/s^2

22. The SI (metric system) units for weight are
A. pounds B. kilograms C. slugs D. newtons

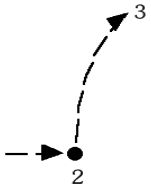
23. An object with zero mass must also have zero weight.
A. True B. False

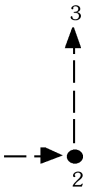
24. A bug is hit by the windshield of a moving bus. The magnitude of force on the bug is __?__ the magnitude of the force on the bus.
A. smaller than
B. greater than
C. equal to
D. there is no force on the bus

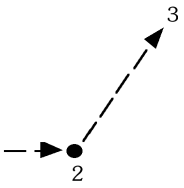
25. A rocket, drifting sideways in outer space from position 1 to position 2, is subject to no outside forces. At 2, the rocket's engine starts to produce a constant thrust at right angles to the line from 1 to 2. The engine turns off again as the rocket reaches some point 3.

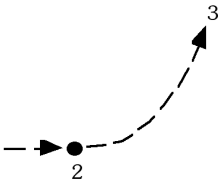


Which path below best represents the path of the rocket between 2 and 3?

A. 

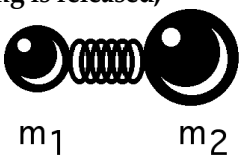
B. 

C. 

D. 

26. When you hold a bowling ball, there is a downward force acting on it. The force that is the Newton's 3rd law pair to that downward force is
A. The force you exert on the ground beneath you
B. The force you exert on the ball
C. The gravitational pull of the ball on the Earth
D. The force the ground exerts on you
E. The gravitational pull of the Earth on the ball

A compressed spring lies between two iron spheres m1 and m2 as shown (m2>m1). If the spring is released,



27. The acceleration will be greater for
    A. m_1 B. m_2 C. same for both

Katya rides an elevator. Coincidentally, she is standing on a bathroom scale while she rides.

28. At some point, she finds that the bathroom scale in the elevator shows a reading less than her actual weight. At that moment, she MUST be
    A. moving upward with constant speed
    B. moving downward with constant speed
    C. at rest
    D. none of these

29. At some point, she finds that the bathroom scale in the elevator shows a reading equal to her actual weight. At that moment, she MUST be
    A. accelerating upward in the elevator
    B. accelerating downward in the elevator
    C. not accelerating in the elevator
    D. A or B but not C

30. At some point, she finds that the bathroom scale in the elevator shows a reading greater than her actual weight. At that moment, she MUST be
    A. accelerating upward in the elevator
    B. accelerating downward in the elevator
    C. not accelerating in the elevator
    D. A or B but not C

31. It is possible for an object with constant velocity to be accelerating.
    A. True B. False

32. An object in uniform circular motion has
    A. a constant magnitude of acceleration
    B. constant orbital radius
    C. constant magnitude of force
    D. constant speed
    E. all of these
    F. none of these

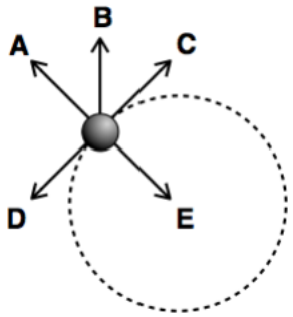
33. The force needed to keep a looping roller coaster in its "circular" path is provided by
    A. centripetal
    B. friction
    C. normal
    D. inertia
    E. lift
    F. weight (gravitational force)

34. A 2 kg ball moves in a circle 3 m in radius at a speed of 5 m/s. The centripetal force acting on it is
    A. 1.1 N B. 3.3 N C. 3.6 N D. 6.7 N E. 17 N

A mass m is whirled around in circular motion. The radius of the circle is r, the speed of the mass is v, and the centripetal force (tension in the string) is F.

35. If the radius and speed were halved, the force required to maintain UCM would be
    A. F/8 C. F/2 E. 2F
    B. F/4 D. F F. 4F

The particle shown to the right is traveling counter-clockwise in uniform circular motion.



36. The net force acting on the particle shown above is in which direction?
    A. A B. B C. C D. D E. E

37. If the force that keeps the object in circular motion suddenly ceases, the particle will travel in which direction?
    A. A C. C E. E
    B. B D. D F. it continues in the circle

38. Planet Rage has the same mass of the Earth but it does not rotate. Your weight on Rage is about
    A. equal to your weight on Earth
    B. substantially more than your weight on Earth
    C. substantially less than your weight on Earth
    D. zero: you'd be weightless

39. Kepler
    A. developed the geocentric model of epicycles and deferents to account for the retrograde motion of Mars.
    B. built and maintained a state-of-the-art observatory in Denmark.
    C. used mathematics and reasoning to develop the theory of universal gravitation.
    D. plotted and analyzed the orbits of the planets and developed three laws of planetary motion.
    E. proposed the "crystalline spheres" geocentric model of the heavens.
    F. proposed the heliocentric model of the heavens in the sixteenth century.

40. Compared to your apparent weight while standing in an open field, your apparent weight while standing in the ground floor of a skyscraper is (at least theoretically)
    A. greater B. lesser

Consider two masses--A and B--at a distance r from each other. A and B have equal masses, m, and are attracted to each other by a force F.

41. If the distance between A and B is reduced to r/2, the force of attraction will be
A. F/4 C. F E. 2F
B. F/2 D. F√2 F. 4F

42. If the masses of A and B are doubled, the force of attraction will be
A. F/4 C. F E. 2F
B. F/2 D. F√2 F. 4F

Consider an object that has a mass m and weight W at the surface of the Earth.

43. At a distance of two Earth radii from the center of the Earth, the object has a mass of
A. 0 C. 0.5m E. 2m
B. 0.25m D. m F. 4m

44. At a distance of two Earth radii from the center of the Earth, the object has a weight of
A. 0 C. 0.5W E. 2W
B. 0.25W D. W F. 4W

45. On a planet with twice the radius and half the mass of the Earth, your weight would be equal to your weight on Earth times a factor of
A. 1/16 C. 1/4 E. 1
B. 1/8 D. 1/2 F. 2

46. Momentum can be thought of as
A. quantity of motion C. how hard it is to stop something
B. inertia in motion D. all of these

47. Consider two vehicles, A and B. Vehicle A has a mass of m and vehicle B has a mass of 2m. If both are moving with the same momentum, which has the greater speed?
A. A B. B C. Same for both

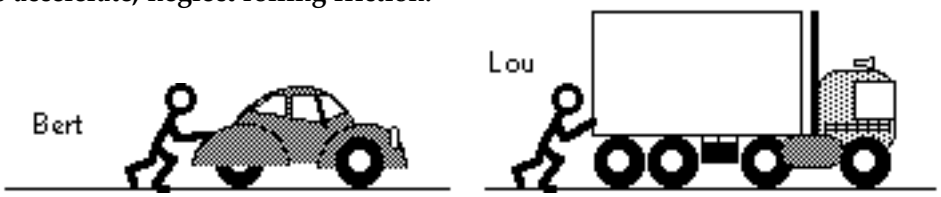
48. Consider two vehicles, A and B. Vehicle A has a mass of 3m and a speed of 2v and vehicle B has a mass of m and a speed of 4v. Which vehicle has more momentum?
A. A B. B C. Same for both

49. What is the momentum of a 400 kg giraffe galloping at 10m/s?
A. 40,000 kg·m/s B. 4000 kg·m/s C. 40 kg·m/s D. 20,000 kg·m/s

50. The momentum change of an object is equal to the
A. net force exerted on the object C. impulse imparted to the object
B. change in velocity of the object D. object's mass times the force exerted

51. Felix the cat falls from a fifth story balcony and lives to meow about it because he flexed (bent) his legs when he landed. Bending the legs on impact
    A. Reduces the impulse imparted to his body
    B. Reduces the change in momentum his body undergoes
    C. Reduces the stopping force acting on his body
    D. Reduces the time over which the stopping force acts on his body
    E. A and B
    F. C and D

Bert and Lou, two musclemen of equal strength, exert equal forces on different vehicles. Bert pushes a lightweight European model, and Lou pushes a Mack truck. They both push their vehicles for 10 s. Both vehicles accelerate; neglect rolling friction.



52. Bert's vehicle now has more momentum than Lou's
    A. True B. False

53. Bert's vehicle now has a greater speed than Lou's
    A. True B. False

54. A 3 kg mass moving at 4 m/s slides across a floor and comes to rest in 6 s. The friction force acting on the mass was
    A. 0.5 N C. 2.0 N E. 8.0 N
    B. 1.0 N D. 4.5 N F. 12 N

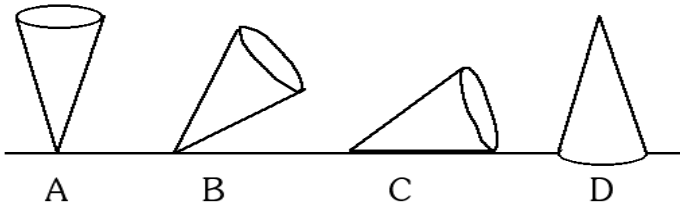
55. A 40 kg child running at 5 m/s jumps into a 10 kg wagon which is initially at rest. What is the final speed of the child in the wagon (most nearly)
    A. 1m/s C. 3m/s E. 5m/s
    B. 2m/s D. 4m/s F. 6m/s

A child throws a ball as high as she can and catches it when it comes back down.

56. As the ball moved upward through the air, its _?_ was transforming to _?_.
    A. work; kinetic energy D. potential energy; kinetic energy
    B. kinetic energy; potential energy E. work; potential energy
    C. potential energy; work F. kinetic energy; work

57. If an object in equilibrium is displaced slightly and accelerates away from its original equilibrium position, we say it is in
    A. stable equilibrium C. neutral equilibrium
    B. unstable equilibrium D. negative equilibrium

Consider cones A-D on the level surface shown below.



58. The object that is not in equilibrium is
A. object A C. object C E. all are in equilibrium
B. object B D. object D

59. How much work is done when a 50 N rock is lifted 10 m?
A. 500 J B. 50 J C. 10 J D. 5 J E. 0.2 J

60. A hapless stuffed animal is tied to a cord. Your physics teacher mercilessly whirls the stuffed animal horizontally around his/her head to demonstrate uniform circular motion. During one orbit, the tension in the cord is 12 N and the circumference of the circle is 4 m. How much work is done on the stuffed animal during each orbit?
A. 96 J B. 48 J C. 16 J D. 3 J E. 0 J

61. A 0.5 kg object is held 12 m above the ground. The amount of gravitational potential energy the object has is (most nearly)
A. 10 J B. 20 J C. 40 J D. 60 J E. 80 J

62. Fifty joules of work are done to accelerate a baseball with a mass of 0.25 kg with a force of 100 N. How much kinetic energy does the baseball gain?
A. 12.5 J C. 50 J E. 200 J
B. 25 J D. 100 J F. 400 J

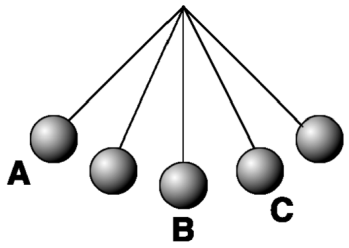
63. A golf ball and a ping pong ball are dropped in a vacuum chamber (no air resistance). When they have fallen halfway down, they have the same
A. speed B. potential energy C. kinetic energy D. momentum

Consider an ideal toy gun. It takes 2 J of work to push the dart into the gun (compressing the spring). The dart has a mass of 0.01 kg.

64. If the gun is fired straight upward, how much potential energy will the dart have when it reaches the apex of its flight?
A. 0 J B. 2 J C. 5 J D. 10 J E. 20 J

65. If the gun is fired straight upward, how high will the dart rise above the gun?
A. 0.005 m C. 5 m E. 50 m
B. 2 m D. 20 m F. 200 m

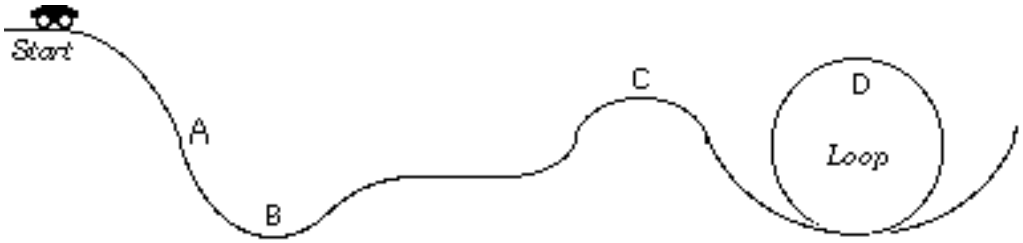
Consider the strobe photograph of an ideal pendulum as it travels from one side to the other, as shown to the right.



66. At which point does the pendulum weight have the greatest total energy?
A. A B. B C. C D. Same for all

67. At which point does the pendulum weight have the greatest momentum?
A. A B. B C. C D. Same for all

68. The amount of work a 0.6 kW electric drill can do in 1 minute is
A. 0.6 J B. 0.6 kJ C. 36 J D. 36 kJ



The roller coaster shown above is frictionless and unaffected by air resistance.

69. At point B
A. the kinetic energy is maximum
B. the speed is minimum
C. the potential energy is at an intermediate value (neither greatest nor smallest)
D. None of these

70. At point C
A. the kinetic energy is maximum
B. the speed is minimum
C. the potential energy is at an intermediate value (neither greatest nor smallest)
D. None of these

PracFinal 1st Semester Physics X
Answer Section

MULTIPLE CHOICE

1. ANS: A TOP: scheme NOT: UT1-03 PracTest
2. ANS: A TOP: Directions NOT: TCJ UT1-03
3. ANS: C TOP: Sci Not Pre NOT: UT2a-03 PracTest UT4-06
4. ANS: C TOP: Order Mag
5. ANS: B TOP: Order Mag NOT: UT1-03 PracTest
6. ANS: A TOP: Definitions NOT: PracTest
7. ANS: B TOP: Definitions
8. ANS: F
9. ANS: B TOP: Interpret Velocity Graph
10. ANS: C TOP: Graph Segments
11. ANS: B TOP: Graph Segments
12. ANS: A TOP: Questions
13. ANS: F TOP: Calculations NOT: TCJ UT2-06
14. ANS: B TOP: Calculations NOT: TCJ
15. ANS: A TOP: Vel and Acc NOT: TCJ
16. ANS: B TOP: Inertia NOT: TCJ UT2-06
17. ANS: D TOP: Motion
18. ANS: C TOP: Zero Net Force
19. ANS: B TOP: a=F/m
20. ANS: B TOP: a=F/m
21. ANS: A TOP: F=ma Calculation
22. ANS: D TOP: Weight NOT: TCJ
23. ANS: A TOP: Weight
24. ANS: C TOP: Newton III NOT: TCJ
25. ANS: D TOP: F.C.I. NOT: FINAL
26. ANS: C TOP: N3 Force Pairs NOT: PracTest
27. ANS: A TOP: Spring Balls NOT: TCJ
28. ANS: D TOP: Normal Elevator
29. ANS: C TOP: Normal Elevator
30. ANS: A TOP: Normal Elevator
31. ANS: B TOP: Circular Motion
32. ANS: E TOP: Tangential
33. ANS: C TOP: Centripetal Force
34. ANS: E TOP: F-mv2/r NOT: TCJ UT4-06
35. ANS: C TOP: F-mv2/r Props
36. ANS: E TOP: UCM Directions
37. ANS: D TOP: UCM Directions
38. ANS: A TOP: Gravity Basics
39. ANS: D TOP: History

40.	**ANS: B**	**TOP:**	**Gravity Basics**	
41.	**ANS: F**	**TOP:**	**Gravity Proportionalities**	
42.	**ANS: F**	**TOP:**	**Gravity Proportionalities**	
43.	**ANS: D**	**TOP:**	**Gravity Distance**	
44.	**ANS: B**	**TOP:**	**Gravity Distance**	
45.	**ANS: B**	**TOP:**	**Grav Prop Vary Mass & Radius**	
46.	**ANS: D**	**TOP:**	**Momentum Concept**	**NOT: TCJ**
47.	**ANS: A**	**TOP:**	**Momentum Concept**	
48.	**ANS: A**	**TOP:**	**Momentum Concept**	
49.	**ANS: B**	**TOP:**	**Momentum Calculations**	**NOT: TCJ**
50.	**ANS: C**	**TOP:**	**Impulse Concept**	**NOT: TCJ**
51.	**ANS: C**	**TOP:**	**Impulse Concept**	**NOT: TCJ UT5-03**
52.	**ANS: B**	**TOP:**	**Bert Lou Impulse**	
53.	**ANS: A**	**TOP:**	**Bert Lou Impulse**	
54.	**ANS: C**	**TOP:**	**Impulse Calculation**	
55.	**ANS: D**	**TOP:**	**Momentum Conservation**	**NOT: UT4-03 TCJ**
56.	**ANS: B**	**TOP:**	**Work Definition**	**NOT: UT6-03 TCJ**
57.	**ANS: B**	**TOP:**	**Equilibrium**	
58.	**ANS: B**	**TOP:**	**Equilibrium Cones**	
59.	**ANS: A**	**TOP:**	**Work Calculation**	
60.	**ANS: E**	**TOP:**	**Work Calculation**	
61.	**ANS: D**	**TOP:**	**PE Calculations**	
62.	**ANS: C**	**TOP:**	**Kinetic Energy**	
63.	**ANS: A**	**TOP:**	**Kinetic and Potential**	
64.	**ANS: B**	**TOP:**	**Toy Gun Conservation**	**NOT: FINAL**
65.	**ANS: D**	**TOP:**	**Toy Gun Conservation**	**NOT: FINAL**
66.	**ANS: D**	**TOP:**	**Energy Pendulum**	**NOT: ?**
67.	**ANS: B**	**TOP:**	**Energy Pendulum**	**NOT: ?**
68.	**ANS: D**	**TOP:**	**Power Calculation**	
69.	**ANS: A**	**TOP:**	**Roller Coaster**	
70.	**ANS: C**	**TOP:**	**Roller Coaster**	