INFFOLINK UNIVERSITY COLLEGE
Physics Worksheet-1 for Remedial Class May, 2023

1.If you were asked for direction to your house from your school, which one of the following is very helpful and provide more information?

A) 600m away from here.
B) 600m due north from here.
C) Both are correct
D) All of the above.

2.Which one of the following is different from others?

A) 600N
B) 700J
C) $10m/s^2$
D) 100kgm/s

3.In graphical representation of vector, the lengths of the arrow represent……

A. Direction of vector
B. Magnitude of vector
C. Both A and B
D. All of the above

4. If two vectors are along the same straight line and the direction of the two vectors is the same, the magnitude of the resultant vector is obtained by

A. algebraic sum of the individual vectors
B. algebraic difference of the individual vectors
C. using Pythagoras theorem
D. all except C

5. _____ is the total path length travelled by moving body in a certain time without specifying its direction.

A. Displacement B. Distance C. Speed D. Velocity

6.Which of the following is *NOT the* characteristics of uniformly accelerated motion?

A. uniformly increasing velocity
B. uniformly decreasing velocity
C. final velocity is greater than initial velocity
D. constant and positive acceleration

7. A man walked 3km for 10sec toward south along a straight line and then walked 4km to east along a straight line for 40sec.What is the average speed average velocity of the man respectively?

A. 140m/s , 140m/s
B. 140m/s ,100m/s
C. 100m/s ,100m/s
D. 100m/s ,140m/s

8.A stone is thrown to a height H=100m and back to the same point along the line. What is the distance and displacement moved by the stone respectively?

A. 100m , 100m
B. 200m , 200m
C. 0m , 200m
D. 200m , 0m

9. A car accelerates steadily from rest at a rate of $4m/s^2$ for 6sec. What are the final velocity and the displacement of the car in this time respectively?

A. 24m/s , 72m
B. 24m/s , 12m
C. 25m/s, 75m
D. 72m/s , 144m

10. What the area enclosed under acceleration time graph represent for an object moving with a constant acceleration?

A. change in time
B. change in displacement
C. change in velocity
D. total in distance

11. If two trains 20km apart are travelling towards each other, one with a velocity of 30m/s and the other moving at 20m/s. How long would it be before the trains pass by each other?

A. 300s B. 400s C. 2000s D. 1000s

12. Consider two vectors $\vec{A}$ and $\vec{B}$ with magnitudes 6 cm and 8 cm, respectively. Vector $\vec{A}$ is along the positive x-axis and vector $\vec{B}$ is along the positive y-axis. What is the magnitude of the resultant vector?

A. 14cm B. 2cm C. 10cm D.4cm

13. Vector A has magnitude 5 m and is directed east. Vector B has magnitude 10m and is directed 30° with positive y-axis (in second quadrant). What is the magnitude of the resultant displacement vector? (Use $\sin 30^\circ = 0.5$ and $\cos 30^\circ = 0.8$)

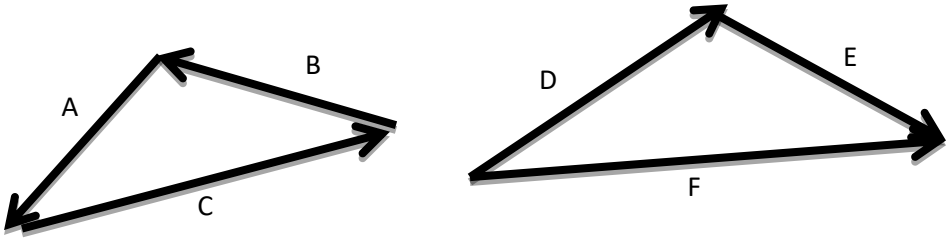
A.0m B.10m C.8m D.5m

14.A plane flies with a velocity of 345 m/s making an angle of 48° with the horizontal. What are the horizontal and the vertical component of velocity for the plane respectively? (Use $\sin 48^\circ = 0.74$, $\cos 48^\circ = 0.67$)

A. 231.15m/s ,255.30m/s B. 255.30m/s ,231.15m/s

C.345m/s, 255.30m/s D. 255.30m/s, 345m/s

15. Which of the six vectors is resultant vector?



A. C B. D C.B D.F

16. Which of the following pairs are both scalar quantities?

A. energy and force B. speed and mass

C. temperature and velocity D. volume and weight

17. Which of the following pairs are both vector quantities?

A. weight and mass B. velocity and speed

C. force and acceleration D. acceleration and speed

18. Which one of the following represents a scalar quantity?

A. The momentum of a rubber ball bouncing off the floor.

B. The velocity of an airplane flying at 300 km/hr on a bearing 40^0.

C. The speed of a car travelling at 100 km/hr.

D. The acceleration of an object thrown vertically upward.

19. Which of the following statements is true?

A. A scalar quantity can be added to a vector

B. Scalar quantities are path dependent, while vectors are not.

C. Scalar quantities and vector quantities can both be added algebraically

D. A scalar contains magnitude and direction while a vector does not.

20. The components of vector A are given as follows:

Ax = 10.7 Ay = 8.3

What is the magnitude of the vector?

A. 7.8 B. 9.5 C. 14.2 D. 16 E. 13.6

21. The components of vector B are given as follows:

Bx = 23.5 B_y = 18.6

What is the measure of the angle, in degrees, that the resultant vector makes with the x-axis?

A. 38.4˚ B. 47.9˚ C. 56.3˚ D. 62˚ E.74.7˚

22. The components of vectors U and V are given as follow:

Ux = -8.6 Vx =10.7

Uy = 9.4 Vy = 4.1

What is the magnitude of the resultant vector?

A. 9.8 B. 13.7 C. 14.6 D. 15.3 E. 16.9

23. The magnitude of vector $\vec{A}$ is 8.6. Vector lies in the fourth quadrant and forms an angle of 37° with the x-axis. What are the components of vector $\vec{A}$? Sin37^0=0.6, Cos37^0=0.8

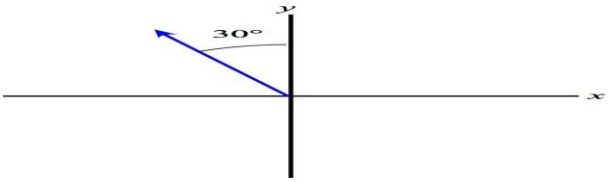
A. Ax = 8.6 Ay = -8.6 C. Ax = -6.9 Ay = -5.2

B. Ax = -6.9 Ay = 5.2 D. Ax = 6.9 Ay = -5.2

24. **A vector has a magnitude of 12. When its tail is at the origin it lies between the positive x axis and the negative y axis and makes an angle of 30° with the x axis. Its y component is:**

A. 6/√3 B. -6√3 C. 6 D. -6

25. **A vector has a component of 12m in the +x direction, a component of 16m in the +y direction. The magnitude of this vector is:**



A. 20m B.15m C.22m D.25m

26. A vector in the xy plane has a magnitude of 25m and an x component of 12m. The angle it makes with the positive x axis is:

A. 26° B. 29° C. 61° D.64°

27. If vector A is added to vector B, the result is 44m. If A is subtracted from B, the result is 29m. What is the magnitude of A and B respectively?

A. $\frac{15}{2}m$ and $\frac{73}{2}m$ B. $\frac{73}{2}$ m and $\frac{15}{2}m$ C. $\frac{2}{73}m$ and $\frac{2}{15}m$ D. $\frac{2}{15}m$ and $\frac{2}{73}$

28. Consider two vectors $\vec{A}$ and $\vec{B}$ with magnitudes 5 cm and 8 cm, respectively. Vector A is along the positive x-axis and vector B is along the positive y-axis. What is the magnitude of the resultant vector?

A. $\sqrt{69}$ cm B. 13 cm C. $\sqrt{89}$ cm D. 3 cm

29. **A man walks 4.65 km West, then 12.7 km in the direction 60^o with the negative x-axis and finally 11.0 km due East. The man is now at_____ due North.**

A. 11Km B.12 Km C.10 Km D. 9Km

30. The following displacement vector has length 10m. What are the *x*- and *y*-components of this vector respectively? Sin30^0=0.5, cos30^0=0.9

A. 5m, 9m B. -5m, 9m C. 9m, 5m D. -9m, -5m

31. If a body travels some distance along a straight line for a given time interval, then for that time interval, its magnitude of

A. Average speed ≥ Average velocity B. Average velocity must be equal to average speed

C. Average speed < Average velocity D. Average velocity ≥ Average speed

32. The slope of a velocity vs time graph tells you

A. velocity B .distance traveled. C. acceleration D. where you are

33. Ten seconds after starting from rest, a freely falling object will have a speed of about

A. 100 m/s B. 50 m/s C. 10m/s D. 500 m/s

34. A racing car traveling with constant acceleration increases its speed from 10 m/s to 50 m/s over a distance of 60 m. How long does this take?

A. 8 s B. 4s C. 5 s D. 2s

35. A car moving with an initial velocity of 25 m/s north has a constant acceleration of 3 m/s² south. After 6 seconds its velocity will be:

A. 7 m/s north B. 7 m/s south C. 43 m/s south D. 43 m/s north

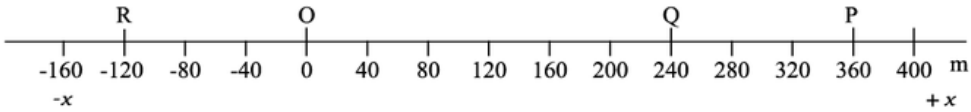
36. An object with an initial velocity of 12 m/s west experiences a constant acceleration of 4 m/s² west for 3 seconds. During this time the object travels a distance of:

A. 12 m B. 54 m C. 36 m D. 24 m

37. How far does a car travel in 6s if its initial velocity is 2 m/s and its acceleration is 2 m/s² in the forward direction?

A. 12 m B. 24 m C. 48 m D. 36 m

38. A car is moving along a straight line, say OP in the figure. It moves from O to P in 18 s and returns from P to Q in 6 s. The average velocity and average speed of the car in going from O to P and back to Q respectively are:



A. 10 m/s & 20 m/s B. 20 m/s & 30 m/s
C. 20 m/s & 20 m/s D. 10 m/s & 10 m/s

39**. The area under a velocity-time graph represents:**

A. speed B. change in acceleration C. displacement D. change in velocity

40**. Displacement can be obtained from:**

A. the slope of an acceleration-time graph
B. the area under a velocity-time graph
C. the area under an acceleration-time graph
D. the slope of a velocity-time graph

41. An object has a constant acceleration of 3 m/s². The displacement versus time graph for this object has a slope

A. that is constant B. that increases with time C. that decreases with time D. of 3 m/s

42. The displacement-time graph of an object in a straight line with a positive slope. The object has:

A. constant velocity B. steadily increasing acceleration
C. steadily decreasing acceleration D. constant displacement

44. A car moves from X to Y with a uniform speed U and returns to X with a uniform speed V. The average speed for this round trip is:

A. 2UV/U+V B. U+V/UV C. U+V/2UV D. UV/U+V

45**. On the way to school, the bus speeds up uniformly from 20 m/s to 36 m/s in 4 seconds. What distance does the bus cover in this time frame?**

A. 80 m B. 144 m C. 64 m D. 112 m

46**. A car accelerates at 2 m/s². Assuming the car starts from rest, how much time does it need to accelerate to a speed of 30 m/s?**

A. 2 seconds B. 60seconds C. 30 seconds D. 15seconds

47. Can an object's average velocity equal zero when object's speed is greater than zero?

A. Yes, when the object moves in a straight line at a constant rate
B. No, it is impossible because they are always equal
C. Yes, when the object returns to its original position
D. No, it is impossible because the magnitude of the velocity is always greater that speed

48. A car accelerates from rest at a constant rate 5 m/s². Which of the following statements is true?

A. The car travels 5 m in every second
B. The car increases its velocity 5 m/s in every second
C. The car decreases its velocity 5 m/s in every second
D. The car's velocity doesn't change

49. A car increases its forward velocity uniformly from 40 m/s to 80 m/s while traveling a distance of 200 m. What is its acceleration during this time?

A. 12m/s² B. 9.6 m/s² C. 8m/s² D. 24 m/s²

50. An object is moving in a straight line with constant acceleration. Initially it is traveling at 16m/s. 3s later it is traveling at

10 m/s. How far does it move during this time?

A. 30 m B. 57 m C. 48 m D. 39 m

51. A car travels at 15 m/s for 10s. It then speeds up with a constant acceleration of 2 m/s^2 for15 s. At the end of this time, what is its velocity?

A. 45 m/s B. 30 m/s C. 15 m/s D. 375 m/s

52. An object moves at a constant speed of 50m/s. This means that the object:

A. Increases its speed by 50m/s every second C. Moves 50 meters every second

B. Decreases its speed by 50 m/s every second D. Doesn't move

53.Ball A is dropped from the top of a building. One second later, ball B is dropped from the same building. Neglect air resistance. As time progresses, the difference in their speeds

A. increases. C. remains constant.

B. decreases. D. cannot be determined from the information given

54. Which of the following quantities has units of a velocity?

A. 40 km southwest C. 9.8 m/s downward

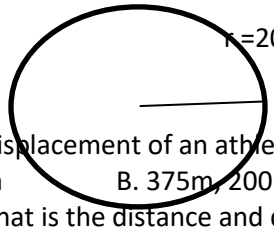
B. 9.8 m/s^2 downward D. 186,000 m

55. You drive 25km at 50 km/h and then another 45km at 90 km/h. Your average speed over the 70km drive will be

A. greater than 70 km/h. C. equal to 70 km/h.

B. less than 70 km/h. D. exactly 38 km/h

56. An athlete is running around a circular track as shown below. If each lap being 1500m and the athletes completes 10 laps.



What is the distance and the displacement of an athletes after half lap respectively?

A. 750m, 375m B. 375m, 200m C. 1125, 400m D. 750m, 400m

57. On question number 10, what is the distance and displacement of the athletes after 3 complete and half of the lap respectively?

A. 5250m, 400m B. 400m, 400m C. 750m, 400m D. 4500m, 400m

58. If the acceleration of an object is zero, then that object can be moving.

A. True B. False

59. If the velocity of an object is zero, then that object can be accelerating.

A. True B. False

60. If the velocity versus time graph of an object is a horizontal line, the object is

A. moving with increasing speed.

B. moving with constant acceleration.

C.at rest.

D. moving with zero acceleration.

61. Under what condition is average velocity equal to the average of the object's initial and final velocity?

A. The acceleration must be constantly decreasing C. This can occur only when the velocity is zero.

B. The acceleration must be constantly increasing. D. The acceleration is constant.

62. A runner runs around a track consisting of two parallel lines 96 m long connected at the ends by two semicircles with a radius of 49 m. She completes one lap in 100 seconds. What is her average velocity?

A. 0 m/s B. 5 m/s C. 10 m/s D. 2.5 m/s

63. An object is moving with constant acceleration in the +x direction. The velocity versus time graph of this object is

A. a horizontal straight line. C. a parabolic curve.

B. a vertical straight line. D. a straight line making an angle with the time axis.

64. An object is released from rest and falls in the absence of air resistance. Which of the following is true about its motion?

A. Its acceleration is zero C. Its acceleration is constant

B. Its velocity is constant D. Its acceleration is increasing

65.The set containing only vector quantities is:

A. Displacement, Acceleration, Speed, Force

B. Force, Velocity, Distance, Acceleration

C. Acceleration, Velocity, Time, Displacement

D. Displacement, Velocity, Acceleration, Force

66. If the positive direction is downward, which situation involves negative velocity and zero acceleration?

A .A rocket slowing down as it moves upward

B. A rocket moving downward at a constant speed

C .A rocket moving upward at a constant speed

D. A rocket speeding up as it moves upward

67. If north is the positive direction, which situation involves positive velocity and negative acceleration?

A. A car speeding up as it moves southward

B. A car moving southward at a constant speed

C. A car slowing down as it moves northward

D. A car slowing down as it moves southward

68. As the force acting on an object decreases, the acceleration of the object

A. increases B. remains the same

C. decreases D. increases, then decreases

69. A force of 12 N gives an object an acceleration of $4m/s^2$. The force required giving it an acceleration of $10m/s^2$ is

A.15 N B. 20 N

C. 25 N D. 30 N

70. As the mass of an object increases, the acceleration of that object

A. increases B. remains the same

C. decreases D. increases, then decreases

71. A girl is pushing a box towards east direction. In which direction should her friend push the box so that it moves faster in the same direction?

A. North B. East

C. South D. West

72. A boy of mass 40 kg jumps off a boat with a velocity of 30m/s. With what momentum does the boat move?

A. −210kg.m/s B .−120kg.m/s

C. −125kg.m/s D. −215kg.m/s

73. Two persons are applying forces on two opposite sides of a moving cart. The cart still moves with the same speed in the same direction. What do you infer about the magnitudes and direction of the forces applied.

A. Force in the direction opposite to the motion is zero

B. Force in the direction opposite to the motion is greater

C. Both are pushing with equal and opposite force

D. Force in the direction of motion is greater.

74. When a net force acts on an object, then the object will accelerate in the direction of force with an acceleration directly proportional to the

A. force on the object B. velocity of the object

C. mass of the object D. inertia of the object

75. The ratio of force and acceleration is

A. mass B. impulse

C. momentum D. work

76. When a body is in linear equilibrium

A. the body is definitely at rest

B. the body is definitely in the state of uniform motion

C. the body will be either at rest or in the state of uniform motion

D. none of these

77. A force 500N applied on a body produces in it an acceleration of $5m/s^2$. The mass of the body is _____

A 20 kg B. 50 kg

C 100 kg D. 200 kg

78. A change in position relative to a body assumed to be at rest is called

A. motion C. momentum

B. inertia D. acceleration

79**. When a body is travelling at constant velocity, the net force on it is zero.**

A. True B. False

80. When the net force acting on a system is zero the body may move with uniform acceleration.

A. True B. False

81. When a body is stationary, then:

A. There is no force acting on it.

B. The body is in vacuum.

C. The forces acting on it is not in contact with it.

D. The net forces acting on it balance each other.

82. When two identical balls are moving with equal speeds in opposite directions, which of the following is true for the system of two bodies?

A. Momentum is zero, kinetic energy is zero

B. Momentum is not zero, kinetic energy is zero

C. Momentum is zero, kinetic energy not zero

D. Momentum is not zero, kinetic energy is not zero

83. A bicyclist moves at a constant speed of 4 m/s. How long it will take for the bicyclist to move 36 m?

A. 3 s B. 6 s C. 12 s D. 9 s

84. If a net force "F" applied to an object of mass "m" will produce an acceleration of "a". What is the mass of a second object which accelerates at "2a"when acted upon by a net force of 5F?

A. $\frac{2m}{5}$ B. 2m

C. $\frac{5m}{2}$ D. 5m

85. A train moves at a constant velocity of 50 km/h. How far will it move in 0.5 h?

A. 10 km B. 20 km

C. 25 km D. 45 km

86. In above figure, two boys A and B are shown applying force on a block. If the block moves towards the right, which one of the following statements is correct?



A. Magnitude of force applied by A is greater than that of B.

B. Magnitude of force applied by A is smaller than that of B.

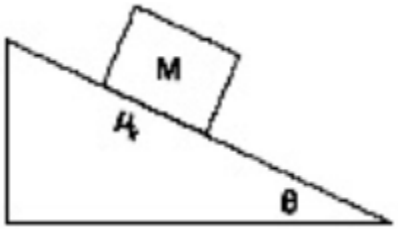
C. Net force on the block is towards A.

D. Magnitude of force applied by A is equal to that of B.

87. What are the units for impulse?

A. N • kg B. N • m C. N • m/s^2 D. N • s

88. A block of mass M slides down an incline having a coefficient of kinetic friction, μ_k. What is the acceleration of the block?

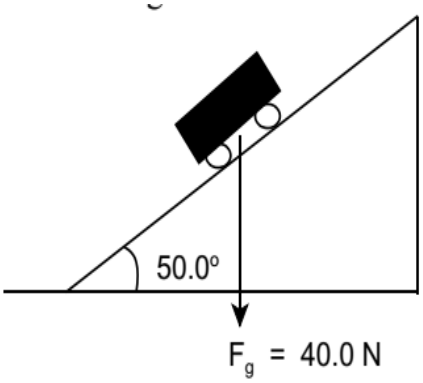


A. mgsinθ B. g(sinθ _ $\mu_k$cosθ)

C. gsinθ _ μ_kg D. g(cosθ _ $\mu_k$sinθ)

89. The diagram below represents a cart moving on a ramp. Assuming no friction, what is the magnitude of the net force acting on the cart?

Use: sin50º=0.8, cos50º=0.6



A. 25 N B. 30 N

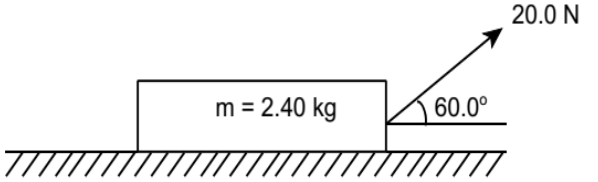
C. 32 N D. 38 N

90. A 75 kg object accelerates down to an inclined plan and the slope makes 16° with the horizontal. What is the magnitude of the frictional force between the object and the slope of the surface? Use, $\sin 16^0$ =0.3, $\cos 16^0$ =0.96,g=10m/s^2, μ_k=0.16

A. 94 N B. 115 N

C. 610 N D. 640 N

91. What is the normal force in the diagram below? Use, $\sin 60^0=0.9$, $\cos 60^0=0.5$, $g=10 m/s^2$, $m=2.4kg$



A. 6N B. 10 N C. 24 N D. 20 N

92. Which one of the following NOT true about uniform motion?

A. The acceleration of the object is not zero.

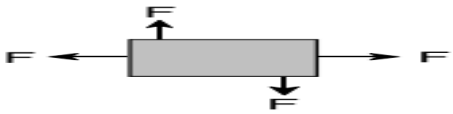
B. The velocity of the object is constant.

C. Distance - time graph is a straight line.

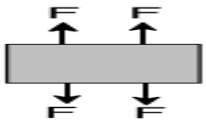
D. The acceleration of the object is zero.

93. For which free body diagram is? $F_{net} \neq 0$

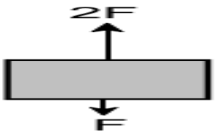
(A)



(B)



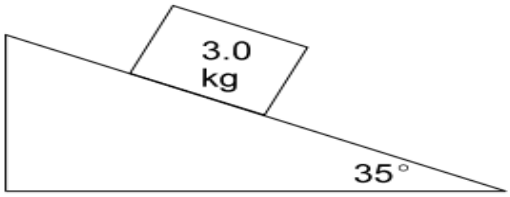
(C)



(D)



94. What force of friction acts on the object shown, if it slides down the incline at a constant velocity? Use, $\sin 35^0=0.6$, $\cos 35^0=0.8$, $g=10 m/s^2$



A. 18N B. 21 N C. 24 N D. 29 N

95. Which of the following statements is correct? The force acting on an object is equivalent to

A. Its change of momentum. B. The impulse it receives per second.

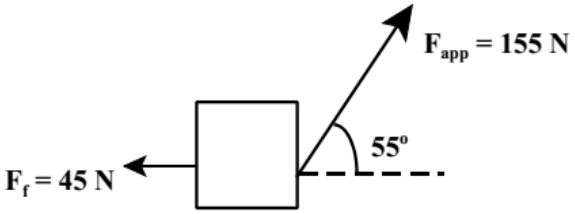
C. The energy it gains per second. D. Its acceleration per meter.

96. Which of the following terms is used to indicate the natural tendency of matter to remain at rest or in motion with constant velocity?

A. Acceleration B. Force

C. Inertia D. Equilibrium

97. What is the magnitude of the net horizontal force acting on the object below? USE ,sin45^0=0.7, cos45^0=0.7



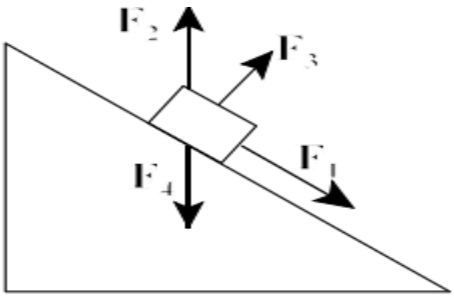
A. 44 N B. 64N C. 82 N D. 110 N

98. The difference between mass and weight is

A. Weight depends on gravity. C. Weight is a scalar, while mas is a vector

B. Mass is a force, and weight is not. D. Mass depends on gravity.

99. The free body diagram below represents an object sliding down a rough incline. Which vector represents the normal force?



A. F1 B. F2 C.F3 D. F4

100. A girl jogs at 2m/s in a straight line for 30 seconds, turns around at 3m/s and returns to her starting point 20 seconds later. What is her average velocity and average speed respectively?

	Average velocity/m s^{-1}	Average speed/m s^{-1}
A	0 m s^{-1}	2.4 m s^{-1}
B	0 m s^{-1}	2.5 m s^{-1}
C	1.0 m s^{-1}	2.0 m s^{-1}
D	2.5 m s^{-1}	2.5 m s^{-1}

101.A green ball moving to the right at 3 m/s strikes a yellow ball moving to the left at 2 m/s. If the balls are equally massive and the collision is elastic.

A. the green ball will move to the left at 3 m/s while the yellow ball moves right at 2 m/s.

B. the green ball will move to the left at 2 m/s while the yellow ball moves right at 3 m/s.

C. The green ball will stop while the yellow ball moves right at 2 m/s.

D. The yellow ball will stop while the green ball moves left at 3 m/s.

102. An object of mass 100kg is accelerated uniformly from a velocity of 4 m/s to 8 m/s in 2 seconds. What is the initial and final momentum of the object respectively?

A. 400kgm/s, 800kgm/s B. 100kgm/s, 400kgm/s

C. 200kgm/s, 400kgm/s D. 400kgm/s, 400kgm/s

103. What options are NOT true about linear momentum of an object?

A. Momentum is a vector quantity

B. The Unit of Momentum is kgm/s

C. Momentum is a scalar quantity

D. When two bodies acts on each other and no external force is acting on the system, then the momentum remains constant

104. **Which of the following statements is true of the amount of horizontal force required to start in motion an object sitting on a horizontal surface?**

A. It must be greater than the coefficient of kinetic friction.

B. It must be greater than the coefficient of static friction.

C. It must be greater than the maximum kinetic friction force.

D. It must be greater than the maximum static friction force.

105. A force cannot change the speed of a moving object.

A. A. True C. False

B. Can't say D. Partially true/false

106. The inertia of an object tends to cause the object

A. to increase its speed

B. to decrease its speed

C. to resist any change in its state of motion

D. to decelerate due to friction

107. What is the numerical formula for force?

A. F=m/a B. F= ma C. $F=m/a^2$ D. $F=a^2m$

108. One Newton is defined as the force which gives a mass of 1 kg and acceleration of.....

A. 1km/h B. $1m^2/s^2$ C. $1Km/h^2$ D. $1m/s^2$

109. What is the SI unit of momentum?

A. kgm/s B. ms/kg C. Kgms D. kg/ms

110. An object of mass 4kg moves with a velocity of 4 m/s, then its momentum will be

A. 16 m/s B. 4 m/s C. 16 kg-m/s D. 4 kg-m/s

111. A force acts on a body of mass 5 kg and changes its velocity from 8 m/s to 12 m/s in 4 s, then magnitude of force is

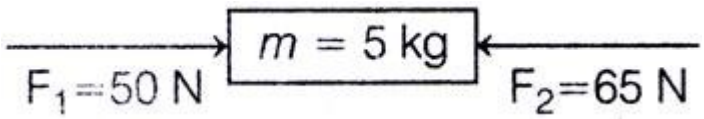
A. 8 N B. 5 N C. 4N D. 6 N

112. The statement "For every action there is an equal and opposite reaction", is related to which of the following?

A. Newton's first law C. Newton's third law

B. Newton's second law D. Law of conservation of momentum

113. Two forces F_1 and F_2 are acting on a body as shown in the figure, then acceleration in the body is



A. $23m/s^2$ B. $3m/s^2$ C. $2m/s^2$ D. $22m/s^2$

114. Match Column I with Column II and choose appropriate option from the codes given below.

	Column I		Column II
(A)	Change in momentum	1.	Kg
(B)	Momentum	2.	N

(C)	Force	3.	Kgm/s
(D)	Mass	4.	N-s

Codes

A. A-3, B-4, C-1, D-2 C. A-4, B-3, C-2, D-1

B. A-4, B-1, C-2, D-3 D. A-1, B-2, C-3, D-4

115. Match the column I with column II and choose the appropriate option from codes given below.

	Column I		Column II
(A)	Recoil of gun	1.	Newton's 2nd law of motion
(B)	Inertia	2.	10^5gcm/s
(C)	Momentum	3.	Newton's 3rd law of motion
(D)	1kgm/s	4.	Newton's 1st law of motion

Codes

A. A-3, B-4, C-1, D-2 C. A-1, B-2, C-3, D-4

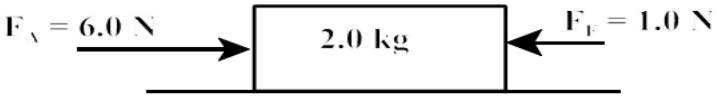
B. A-4, B-1, C-2, D-3 D. A-2, B-4, C-1, D-3

12. The resultant force acting on a body is zero, then

A. body is in unequilibrium C. body moves with constant acceleration

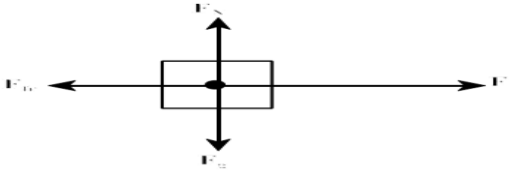
B. body is in equilibrium D. body moves with retardation

116. What is the magnitude of the acceleration for the object shown below?



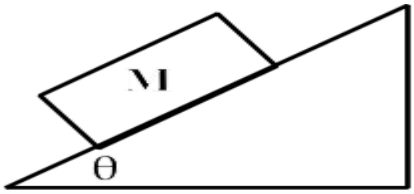
A. 2.5 m/s^2 B. 3.0 m/s^2 C. 9.8 m/s^2 D. 12 m/s^2

117. Which represents the coefficient of kinetic friction for the diagram below?



A. F/F_g B. F_{fr}/F C.F_N/F_g D. F_{fr}/F_N

118. In the diagram below, what causes acceleration down the incline? (Ignore friction)

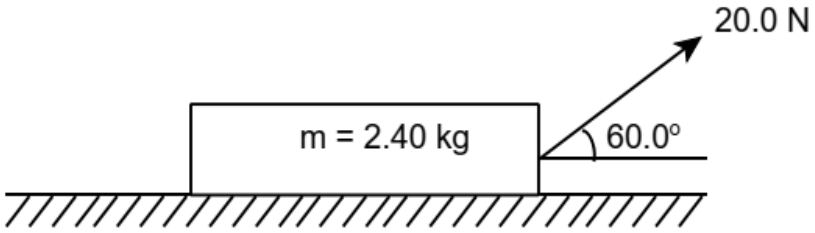


A. M cosθ B. Mg cosθ C. Mg sinθ D. M sinθ

119. What is the frictional force for a 24 kg object freely sliding on a horizontal surface if :μ_k= 0.25? g=10m/s^2

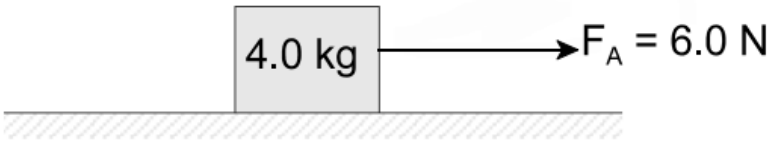
A.60 N B. 24 N C. 57N D. 96 N

120. What is the normal force in the diagram below? g=9.8m/s^2,sin60^0=0.866, cos60^0=0.5



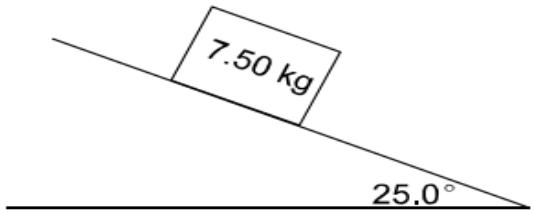
A. 6.20 N B. 10.0 N C. 13.2 N D. 23.5 N

121. What is the magnitude of the acceleration for the object below if Ff = 1.0 N?



A. 0.80 m/s^2 B .1.3 m/s^2 C. 1.25 m/s^2 D. 1.8 m/s^2

122. What is the normal force acting on the 7.50 kg box shown? g=9.8m/s^2, sin25^0=0.423, cos25^0=0.906



A. 3.17 N B. 6.80 N C. 31.1 N D. 66.6 N

123. A 5000kg airplane moves in straight flight at constant speed. The force of air friction is 900 N. The net force on the plane is:

A. zero B. 5900 N C. 900 N D. 5000 N

124. A crate is sliding down an incline that is 35◦ above the horizontal. If the coefficient of kinetic friction is 0.40, the acceleration of the crate is:

A. 0 B. 2.4 m/s^2 C. 5.8 m/s^2 D. 8.8 m/s^2

125. A block is placed on a rough wooden plane. It is found that when the plane is tilted 30◦ to the horizontal, the block will slide down at constant speed. The coefficient of kinetic friction of the block with the plane is:

A. 0.500 B. 0.577 C. 1.73 D. 0.866

126.A block slides down a frictionless plane that makes an angle of 30◦ with the horizontal. The acceleration of the block is:

A. 980 cm/s^2 B. 566 cm/s^2 C. 849 cm/s^2 D. 490 cm/s^2

127. A 25N crate slides down a frictionless incline that is 25◦ above the horizontal. The magnitude of the normal force of the incline on the crate is:

A. 11 N B. 23 N C. 25 N D. 100 N

128.The "reaction" force does not cancel the "action" force because:

A. the action force is greater than the reaction force
B. they are on different bodies
C. they are in the same direction
D. the reaction force exists only after the action force is removed

129. A book rests on a table, exerting a downward force on the table. The reaction to this force is:

A. the force of Earth on the book
B. the force of the table on the book

C. the force of Earth on the table

D. the force of the book on Earth

130. A 6-kg object is moving south. A net force of 12 N north on it results in the object having an acceleration of:

A. 2 m/s^2, north B. 2 m/s^2, south

C. 6 m/s^2, north D. 18 m/s^2, north

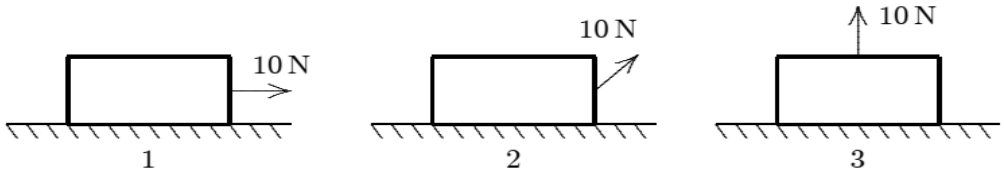
131. A constant force of 8.0 N is exerted for 4.0 s on a 16-kg object initially at rest. The change in speed of this object will be:

A. 0.5 m/s B. 2 m/s C. 4 m/s D. 8 m/s

132. A car travels east at constant velocity. The net force on the car is:

A. east B. up C. down D. zero

133. A crate rests on a horizontal surface and a woman pulls on it with a 10N force. Rank the situations shown below according to the magnitude of the normal force exerted by the surface on the crate, least to greatest.



A. 1, 2, 3 B. 3, 2, 1

C. 2, 3, 1 D. 1, 3, 2

134. The inertia of a body tends to cause the body to:

A. speed up C. resist any change in its motion

B. slow down D. decelerate due to friction

135. Acceleration is always in the direction:

A. of the displacement C. of the final velocity

B. of the initial velocity D. of the net force

136. A force of 1 N is:

A. 1 kg · m^2/s^2 C. 1 kg · m/s^2

B. 1 kg · m/s D. 1 kg · m^2/s

137. Newton Second law of motion states that,

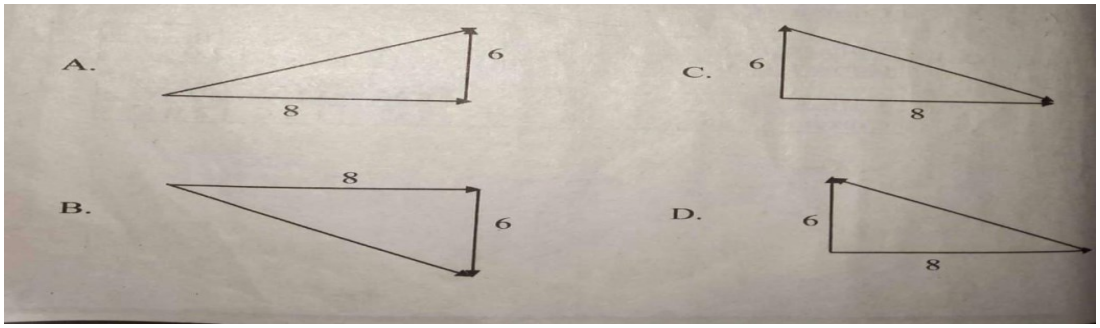
A. The rate of change of velocity of an object is directly proportional to net force on it.

B. The net force on an object is inversely proportional to the acceleration.

C. The velocity of an object is directly proportional to the net force on it.

D. Any force exerted on an object is directly proportional to its acceleration.

138. Two vectors of magnitude 8 units in the direction of East and the second vector of magnitude 6 units in the direction of North are given. If you add the two vectors using graphical method, which graph represents the resultant of the two vectors?



139. A car travelling at 20 m/s starts to speedup. After 5 minutes its speed is 144 m/s. What is the acceleration of the car?

A. 28.8 m/s C. 24.8 m/s

B. 0.41 m/s D. 0.55 m/s

140. Which one of the following statements is NOT correct about the concept and units of coefficient of friction?

A. Coefficient of friction is the ratio of frictional force to normal force.

B. Coefficient of static friction is less than its value of kinetic friction.

C. Coefficient of static friction has no unit.

D. The coefficient of friction is always less or equal to unity (1).

141. A car is traveling at constant velocity along a straight line. Which, statement is correct?

A. The displacement of the car increase linearly with time.

B. The displacement of the car is in opposite direction.

C. The net force on the car is different from zero.

D. The acceleration of the car is in opposite direction.

142. A racing car traveling with constant acceleration increases its speed from 10m/s to 50m/s over a distance of 60 m. How long does this take?

A. 2 s B. 4 s C. 5 s D. 8 s

143. An object dropped from the window of a tall building hits the ground in 12 s. The height of the window above the ground is: g=9.8m/s^2

A. 29.4 m B. 58.8 m C. 118 m D. 706 m

145. A torque of 30Nm is applied on a 5kg wheel whose moment of inertia is 2kgm^2 for 10sec.The angle covered by the wheel in 10sec would be

A.600 rad B. 750 rad. C. 1500 rad D. 3000 rad E. none

147. A constant torque of 700 Nm turns a wheel of moment of inertia 50kgm^2 about an axis passing through the center. Angular velocity of the wheel after 2sec will be

A. 1 rad/s B. 15 rad/s C. 28 rad/s D. 5 rad/s E. none

149. The moment of inertia of a meter stick of mass 600g, about an axis at right angles to the stick and located at 30 cm mark is

A. 7.2 x 10^5 gcm^2 B. 7.4 x 10^5 gcm^2 C. 5.4 x 10^5 gcm^2 D. 20 x 10^5 gcm^2 E. none

151. If a constant net torque is applied to an object, that object will

A. rotate with constant linear velocity.

B. rotate with constant angular velocity.

C. have an increasing moment of inertia.

D. have a decreasing moment of inertia.

E. rotate with constant angular acceleration.

152. Angular momentum cannot be conserved if

A. there is a net force on the system.

B. the moment of inertia changes.

C. the angular displacement changes.

D. there is net torque on the system.

E. the angular velocity changes

153. If moment of inertia of a wheel, having radius of gyration 60 cm, is 360 kg-m^2, then mass of the wheel is

A. 200 kg B. 500 kg C. 800 kg D. 1000 kg E. none

154.A car begins driving from a stationary position. It accelerates at 4 m/s^2 for 10 seconds, then travels at a steady speed for another 10 seconds, all in the same direction. How much distance has it covered since it started driving?

A. 200 m B. 400 m C. 600 m D. 800 m

155. Which of the following can be true at the same time?

I. Velocity: Constant; Acceleration: Constant

II. Velocity: Constant; Acceleration: Changing

III. Velocity: Changing; Acceleration: Constant

IV. Velocity: Changing; Acceleration: Changing

A. I only B. II only C. IV only D. III and IV E. I, III, and IV

156. A stone is tossed straight upwards with initial positive velocity of 50 m/s. What is its instantaneous velocity and acceleration at the highest point of its trajectory?

A. Velocity = 0 m/s ; Acceleration = 0 m/s^2

B. Velocity = 50 m/s ; Acceleration = – 9.8 m/s^2

C. Velocity = – 50 m/s ; Acceleration = 0 m/s^2

D. Velocity = 0 m/s ; Acceleration = – 9.8 m/s^2

E. Velocity = 30 m/s ; Acceleration = 0 m/s^2

157. An object is moving at constant speed. Which statement must be true?

A. The acceleration of the object must be zero

B. The direction of the object is not changing

C. The velocity of the object is constant

D. All of the above E. None of the above

158. When a stone is thrown directly upwards with initial velocity of 30 m/s, what will be the maximum height it will reach and when will it be? Acceleration due to gravity is 10 m/s^2

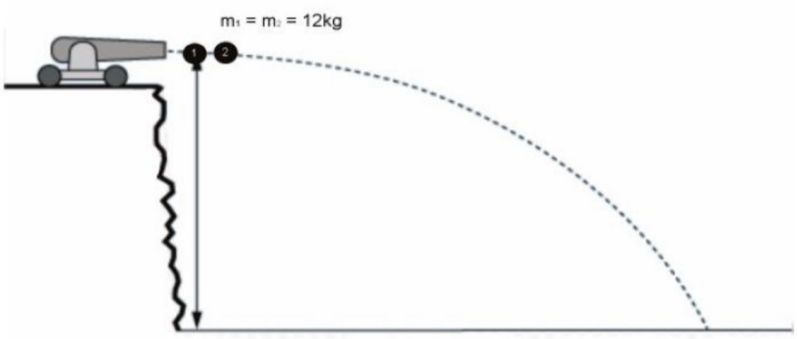
A. 45 m in 3 sec B. 90 m in 6 sec C. 1.5 m in 3 sec

D. 90 m in 3 sec E. 45 m in 6 sec

159. A car spends two hours driving at 20 km/h, and then an hour driving at 50 km/h. What is the average speed of the car?

A. 50 km/h B. 45 km/h C. 35 km/h D. 30 km/h E. 20 km/h

160. A cannon fires cannon ball 1 of mass m_1= 12 kg horizontally at constant velocity v = 20 m/s. At the same time, cannon ball 2 of mass m_2= 24 kg is dropped from an equal height. The fired ball lands after a time t_1, while the dropped ball lands after a time t_2.



Ignoring air resistance, which of the following is true?

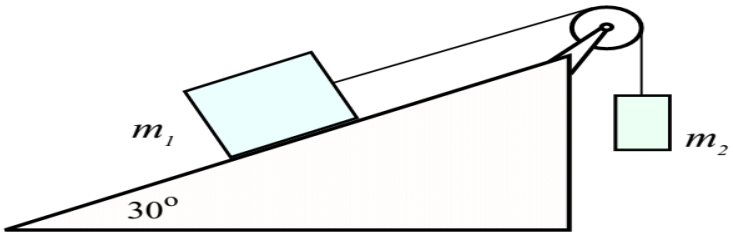
A. $t_1 > t_2$ B. $t_1 < t_2$ C. $t_1 = t_2$

D. It is not possible to determine the relationship between t_1 and t_2

161. A 16 kg object has a velocity of $3\hat{i}$ m/s at one instant. Four seconds later, its velocity is ($7\hat{i} + 3\hat{j}$) m /s. Assuming the object was subject to a constant net force, what is the magnitude of the force acting on the object?

A.20N B.40N C.15N D.80N E.25N

161. A block of mass m_1= 2 kg on a frictionless inclined plane of angle θ = 30^0 is connected by a cord over a massless, frictionless pulley to a second block of mass m_2 = 3 kg hanging vertically, as shown in Fig. What is the magnitude of the acceleration of each block?

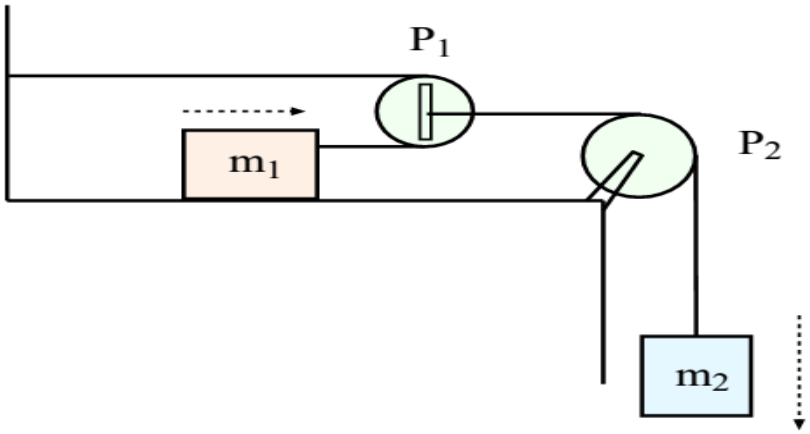


A. 2 m/s^2 B. 4 m/s^2 C. 1 m/s^2 D.3 m/s^2 E.5 m/s^2

162. Referring the above question, what is the tension in the cord?

A. 18N B. 42N C.28N D. 15N

163. Mass m_1 on a frictionless horizontal table is connected to mass m_2 through a massless pulley P_1 and a massless fixed pulley P_2 as shown in Fig . If a_1 and a_2 are the magnitudes of the accelerations of m_1 and m_2 respectively, what is the relationship between these accelerations?



A. $a_1=a_2$ B. $a_1=2a_2$ C. $a_2=2a_1$ D. $a_2=3a_1$ E.$a_1=4a_2$

164. A cyclist of mass 30 kg exerts a force of 250 N to move his cycle. The acceleration is 4 m/s^2. The force of friction between the road and tires will be

A. 120 N B. 130 N C. 150N D. 115 N

165. A block A of mass m_1 is released from top of smooth inclined plane and it slides down the plane. Another block of mass m_2 such that $m_2 > m_1$ is dropped from the same point and falls vertically downwards. Which one of the following statements will be true if the friction offered by air is negligible?

A. Both blocks will reach ground at same time
B. Both blocks will reach ground with the same speed
C. speed of both blocks when they reach ground will depend on their masses
D. Block A reaches ground before block B

166. Newton's first law of motion states that an object's motion will not change unless

A. the net force acting on it is greater than zero.
B. a force continues to be applied to the object.
C. its inertia is stronger than the applied force.
D. the object has no inertia.

167. It is more difficult to start a 50-kg box sliding across the floor than a 30-kg box because the 50-kg box has a greater

A. size B. inertia C. volume D. velocity

168. Which of the Laws of motion asserts that a single isolated force doesn't exist?

A. the first law B. the second law C. the third law D. none

169. A body is moving along a circular path with variable speed, it has

A. A radial acceleration C. A tangential acceleration

B. Zero acceleration D. Both radial and tangential acceleration

170. A particle is performing a Uniform Circular Motion. Which is the wrong statement regarding its motion?

A. The velocity vector is tangential to the circle

B. The acceleration vector is tangential to the circle

C. The acceleration vector is directed towards the center of the circle

D. The velocity and acceleration vectors are perpendicular to each other

171. A stone is tied to one end of a string. Holding the other end, the string is whirled in a horizontal plane with progressively increasing speed. It breaks at some speed because

A. Gravitational forces of the earth are greater than the tension in the string.

B. The required centripetal force is greater than the tension sustained by the string.

C. The required centripetal force is less than the tension in the string.

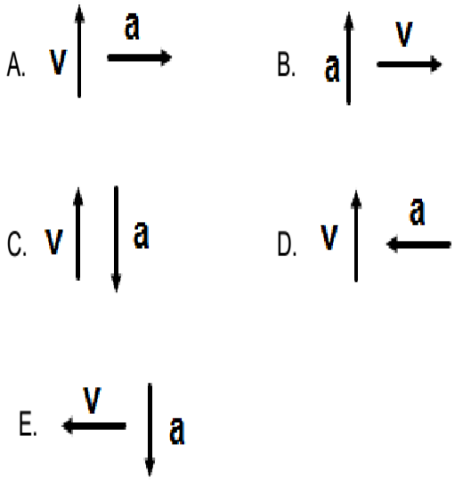
D. The centripetal force is greater than the weight of the stone.

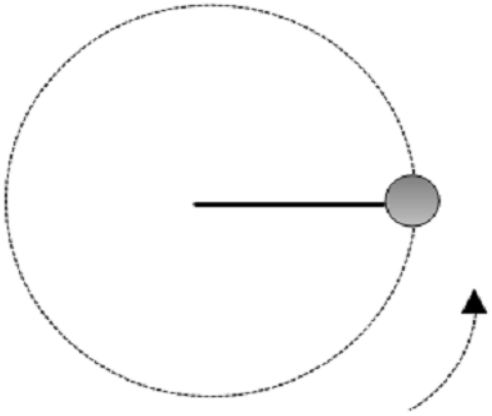
172. An object of mass m moves at a constant speed v around a circular path of radius r. The net force applied on the object is F. What happens to the net force if speed is doubled and radius is quadrupled?

A. It doubles B. It quadruples C. Stays the same

D. It is cut to one-half E. It is cut to one-quarter

173. A small sphere is swung in a vertical circle. Which of the following combinations represents the direction of the velocity and acceleration at the right-most point of the circle?





174. The weakest of the four fundamental forces is

A. Gravity B. weak nuclear force C. Electromagnetism D. Strong nuclear force

175. Which is a factor that affects the strength of gravitational , magnetic and electrostatic force field?

A. mass B. distance C. volume D. density E. charge

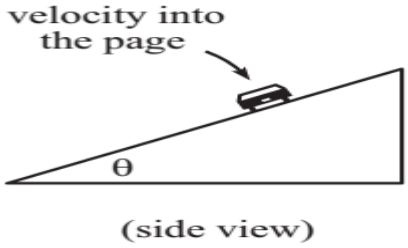
176. If a ball is dropped from rest, it will fall 20 m during the first two seconds. How far will it fall during the fourth seconds?

A. 20m B. 25m C. 30m D.35m E. 40m

177. A football player kicks a ball with an initial velocity of 25m/s at an angle of 53^0 above the horizontal. What is the range of the ball?

A. 250 m B. 200. m C. 150 m D. 300. m

178. A racecar travels in a horizontal circle at constant speed around a circular banked track. A side view is shown in Fig. The direction of the racecar's acceleration is



(side view)

A. horizontal rightward
B. downward along the plane
C. horizontal leftward
D. upward perpendicular to the plane
E. The acceleration is zero.

179. Water in a bucket tied with rope is whirled around in a vertical circle of radius 0.5 m. Calculate the minimum velocity at the lowest point so that the water does not spill from it in the course of motion.

A. 25m/s B. 5m/s C. $\sqrt{5}$ m/s D.50m/s

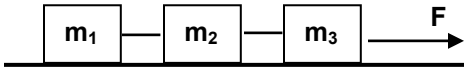
180. What should be the coefficient of static friction at the pavement, for a car moving with maximum speed of 20m/s in a circle of radius 50m on a flat road, to make turns successfully?

A. 0.2 B. 0.4 C. 0.6 D. 0.8 E. 0.5

181. Three blocks of mass m_1, m_2, and m_3 are connected by thread and placed on a smooth horizontal surface as shown in the figure below. A force F is applied on the block of mass m_3 in forward direction as shown. Neglecting friction, find the tension in the thread connecting m_1 and m_2.

A. $\frac{m_1 F}{m_1+m_2+m_3}$ C. $F-\frac{m_3 F}{m_1+m_2+m_3}$

B. $\frac{m_2 F}{m_1+m_2+m_3}$ D. $\frac{(m_2+m_3)F}{m_1+m_2+m_3}$



182. A 4 kg block is given an initial speed of $8\frac{m}{s}$ at the bottom of 30^0 inclined plane. The frictional force that retards its motion is 15N. If the block is directed up the inclined plane, how far will it move before it stops?

A. 3.35m B. 3.66m C. 4.40m D. 4.67m E. none

183. A driver moving at a constant speed of 30 m/s sees an accident up ahead and hits the brakes. If the car decelerates at a constant rate of -5 m/s^2, how far does the car go before it comes to a stop?

A. 120m B. 40m C.100m D. 20m E. none

184. An automobile enters a circular curve of radius 50 m. If the wheels of the automobile can tolerate a maximum transverse acceleration of 16 m/s^2 without skidding, what is the maximum permissible speed?

A. 15m/s B.30m/s C. 20m/s D.10m/s

185. At a speedway in Texas, a curve of radius 500 m is banked at an angle of 22°. If the driver of a racing car does not wish to rely on friction, at what speed should he take this curve? [Use $\tan 22^0 = 0.4$]

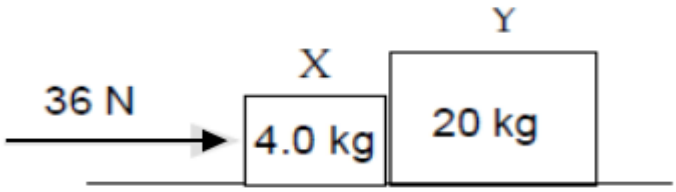
A. 44.7m/s B. 37.9m/s C. 14.1m/s D.70.7 m/s

186. A block rests on a flat plane inclined at an angle of 30^0 with respect to the horizontal.

What is the minimum coefficient of friction necessary to keep the block from sliding?

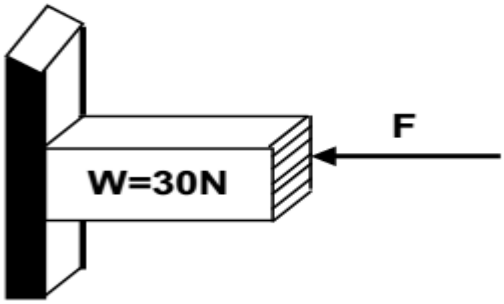
A. 1/2 B. 1/√2 C. 1/√3 D. 1/4 E. 2/√3

187. Two blocks X and Y are in contact on a horizontal frictionless surface. A 36 N constant force is applied to X as shown to the right. The force exerted by X on Y is:



A. 1.5 N B. 6.0 N C. 29 N D. 30 N E. 36 N

188. A horizontal force F = 48N pushes a block weighing 30N against a vertical wall as shown in figure below. The coefficient of kinetic frictions is 0.5. What is the acceleration of the block if it slides down?



A. 3m/s^2 B. 4m/s^2 C. 2m/s^2 D. 2.5m/s^2 E. None

THE END!