PHYSICS

BOOKS - PREMIERS PUBLISHERS

LAW OF MOTION

Evaluation Textbook Questions Answers Multiple Choose Questions

1. When a car takes a sudden left turn in the curved road passendgers are pushed towards

the right due to

A. inertia of direction

B. inertia of motion

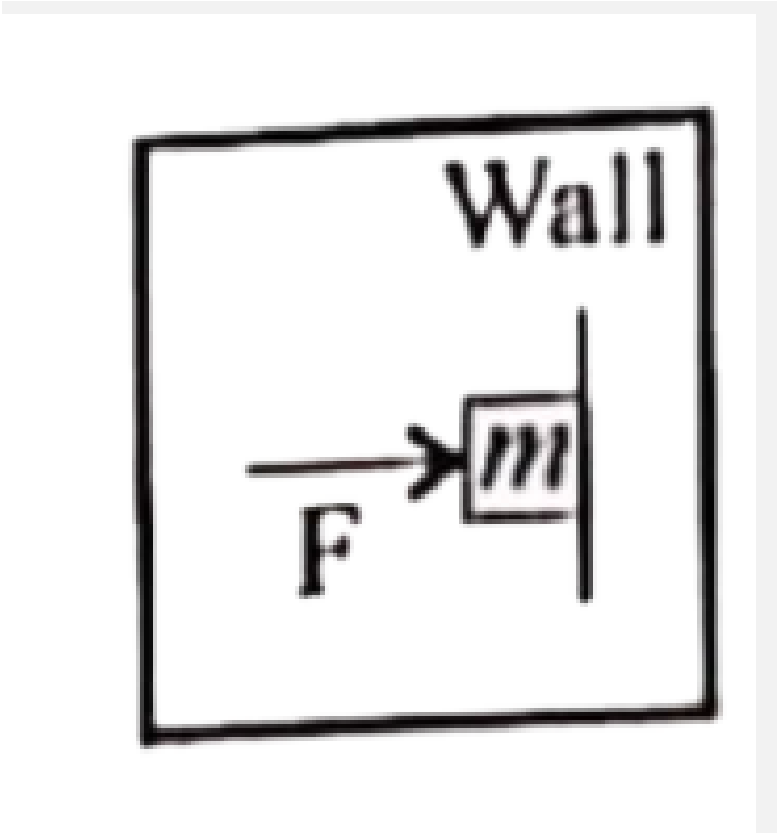
C. inertia of rest

D. absence of inertia

Answer: a

 Watch Video Solution

2. An object of mass m held against a vertical wall by applying horizonatal force F as the minimum of the force is



A. less then mg

B. equal to mg

C. greater than mg

D. cannot determine

Answer: c

Watch Video Solution

3. A vehicle is moving along the positive x direction if sudden brake is applied then

A. frictional force acting on the vehicle is along negative x direction

B. frictional force acting on the vehicle is along positive x direction

C. no frictional force acts on the vehicle

D. frictional force acts in downward direction

Answer: a

Watch Video Solution

4. A book is at rest on the table which exerts a normal force on the book if this force is considered as reaction force what is the action force according to newton third law ?

A. gavitational force exerted by earth on the book

B. gravitonal force exerted by the book on earth

C. normal force exerted by the book on the table

D. none of the above

Answer: c

Watch Video Solution

5. Two masses M_1 and m_2 are experiencing the same force where $m_1 < m_2$ the ratio of their acceleration $\frac{a_1}{a_2}$ is

A. 1

B. less than 1

C. greater than 1

D. all the three cases

Answer: c

Watch Video Solution

6. Choose appropriate free body diagram for the particle experiencing net accleration along negative y direction

A. 

B. 

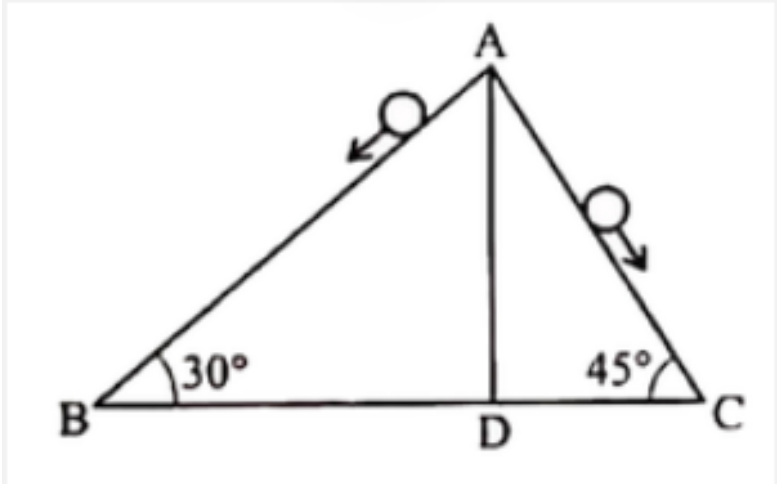
C. 

D. 

Answer: c

View Text Solution

7. A particle of mass m sliding on the smooth double inclided plane will experience



A. greater acceleration along the path ab

B. greater acceleration along the path ac

C. same acceleraton in both the paths

D. no acceleration in both paths

Answer: b

Watch Video Solution

8. Two blocks of masses m and 2m are placed on a smooth horizontal surface as shown in the first case only a force F_1 is applied from the left later only a force F_2 is applied from the right if the force acting at the interface of the two blocks in the two case is same then $F_1 : F_2$ is

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:3$

Answer: c

Watch Video Solution

9. A particle is moving in a circle with a constant speed. Its moving is

A. always zero

B. need not be zero

C. always non zero

D. cannot be concluded

Answer: b

Watch Video Solution

10. An object of mass m begins to move on the plane inclined at an angle θ the coefficient of static friction of inclined surface is μ_s the maximum static friction experienced by the mass is

A. mg

B. μ_s mg

C. μ_s ms sin θ

D. μ_s mg cos θ

Answer: d

Watch Video Solution

11. When the object is moving at constant velocity on the rough surface

A. net force on the object is zero

B. no force acts on the object

C. only external force acts on the object

D. only kinetic friction acts on the object

Answer: a

Watch Video Solution

12. When the object is at rest on the inclined rough surface

A. static and kinetic frictions acting on the object is zero

B. static friction is zero kinetic friction is not zero

C. static friction is not zero and kinetic friction is zero

D. static and kinetic frictions are not zero

Answer: c

Watch Video Solution

13. The centrifugal force appears to exist

A. only in inertial frames

B. only in rotating frames

C. in any accelerated frame

D. both in inrtial and non inertial frames

Answer: b

Watch Video Solution

14. Choose the correct statement from the following

A. centrifugal and centripetal forces are action reaction pairs

B. centripetal forces in a natureal force

C. centrifugal force arises from gravitational force

D. centripetal force acts towards the centre and centrifugal force appears to act

away from the centre in a circular motion

Answer: d

Watch Video Solution

15. If a person moving from pole to equator of the earth then the centrifugal force acting on him is

A. increases

B. decreases

C. remains the same

D. increases and then decreases

Answer: a

Watch Video Solution

16. When a car takes a sudden left turn in the curved road passendgers are pushed towards the right due to

A. inertia of direction

B. inertia of motion

C. inertia of rest

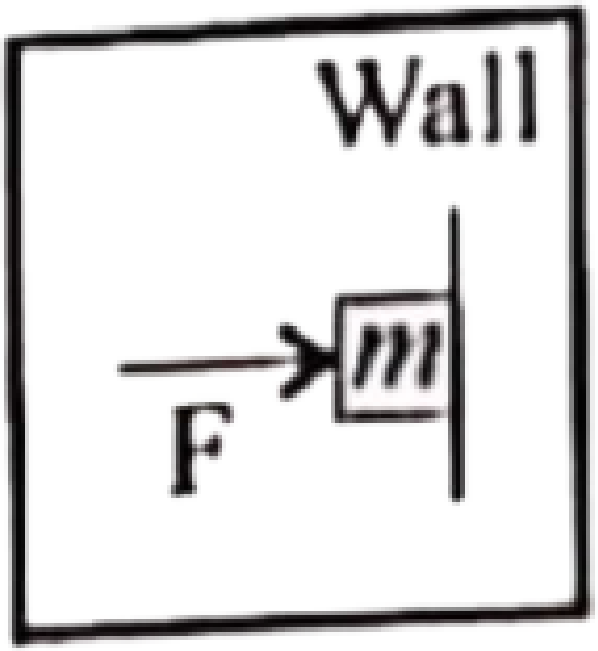
D. absence of inertia

Answer: a

Watch Video Solution

17. An object of mass m held against a vertical wall by applying horizonatal force F as the

minimum of the force is



A. less then mg

B. equal to mg

C. greater than mg

D. cannot determine

Answer: c

Watch Video Solution

18. A vehicle is moving along the positive x direction if sudden brake is applied then

A. frictional force acting on the vehicle is along negative x direction

B. frictional force acting on the vehicle is along positive x direction

C. no frictional force acts on the vehicle

D. frictional force acts in downward direction

Answer: a

Watch Video Solution

19. A book is at rest on the table which exerts a normal force on the book if this force is considered as reaction force what is the action force according to newton third law ?

A. gavitational force exerted by earth on the book

B. gravitonal force exerted by the book on earth

C. normal force exerted by the book on the table

D. none of the above

Answer: c

Watch Video Solution

20. Two masses M_1 and m_2 are experiencing the same force where $m_1 < m_2$ the ratio of their acceleration $\frac{a_1}{a_2}$ is

A. 1

B. less than 1

C. greater than 1

D. all the three cases

Answer: c

Watch Video Solution

21. Choose appropriate free body diagram for the particle experiencing net accleration along negative y direction

A. 

B. 

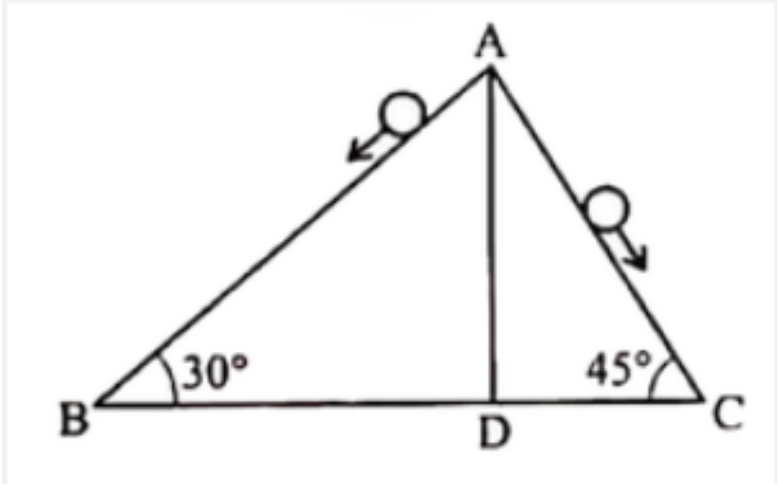
C. 

D. 

Answer: c

View Text Solution

22. A particle of mass m sliding on the smooth double inclided plane will experience



A. greater acceleration along the path ab

B. greater acceleration along the path ac

C. same acceleraton in both the paths

D. no acceleration in both paths

Answer: b

Watch Video Solution

23. Two blocks of masses m and 2m are placed on a smooth horizontal surface as shown in the first case only a force F_1 is applied from the left later only a force F_2 is applied from the right if the force acting at the interface of the two blocks in the two case is same then $F_1 : F_2$ is

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:3$

Answer: c

Watch Video Solution

24. Force acting on the particle moving with constant speed is

A. always zero

B. need not be zero

C. always non zero

D. cannot be concluded

Answer: b

View Text Solution

25. An object of mass m begins to move on the plane inclined at an angle θ the coefficient of static friction of inclined surface is μ_s the maximum static friction experienced by the mass is

A. mg

B. μ_s mg

C. μ_s ms sin θ

D. μ_s mg cos θ

Answer: d

Watch Video Solution

26. When the object is moving at constant velocity on the rough surface

A. net force on the object is zero

B. no force acts on the object

C. only external force acts on the object

D. only kinetic friction acts on the object

Answer: a

Watch Video Solution

27. When the object is at rest on the inclined rough surface

A. static and kinetic frictions acting on the object is zero

B. static friction is zero kinetic friction is not zero

C. static friction is not zero and kinetic friction is zero

D. static and kinetic frictions are not zero

Answer: c

Watch Video Solution

28. The centrifugal force appears to exist

A. only in inertial frames

B. only in rotating frames

C. in any accelerated frame

D. both in inrtial and non inertial frames

Answer: b

 Watch Video Solution

29. Choose the correct statement from the following

A. centrifugal and centripetal forces are action reaction pairs

B. centripetal forces in a natureal force

C. centrifugal force arises from gravitational force

D. centripetal force acts towards the centre and centrifugal force appears to act

away from the centre in a circular motion

Answer: d

Watch Video Solution

30. If a person moving from pole to equator of the earth then the centrifugal force acting on him is

A. increases

B. decreases

C. remains the same

D. increases and then decreases

Answer: a

Watch Video Solution

Evaluation Textbook Questions Answers Ii Short Answer Questions

1. Explain the concept of inertia write two examples each inertia of motion inertia of rest and inertia of direction

Watch Video Solution

2. State newton's second law

Watch Video Solution

3. Define one newton

Watch Video Solution

4. Show that impulse is the change of momentum

Watch Video Solution

5. Using free body diagram show that it is easy to pull an object than to push it

Watch Video Solution

6. Explain various types of friction suggest a few methods to reduce friction

Watch Video Solution

7. Pseudo Force

Watch Video Solution

8. State the empirical laws of static and kinetic friction

Watch Video Solution

9. State newton's third law

Watch Video Solution

10. What are interial frames ?

Watch Video Solution

11. Under what condion will a car skid on a leveled circular road ?

Watch Video Solution

12. Explain the concept of inertia write two examples each inertia of motion inertia of rest and inertia of direction

Watch Video Solution

13. State Newton's second law .

Watch Video Solution

14. Define one newton

Watch Video Solution

15. Show that impulse is the change of momentum

Watch Video Solution

16. Using free body diagram show that it is easy to pull an object than to push it

Watch Video Solution

17. Explain various types of friction suggest a few methods to reduce friction

Watch Video Solution

18. pseudo force

Watch Video Solution

19. State the empirical laws of static and kinetic friction

Watch Video Solution

20. State newton's third law

Watch Video Solution

21. What are interial frames ?

Watch Video Solution

22. Under what condion will a car skid on a leveled circular road ?

Watch Video Solution

Evaluation Textbook Questions Answers Iii Long Answer Questions

1. Prove the law of conservation of linear momentum use it to find the recoil velocity of a gun when a bullet is fired from it

Watch Video Solution

2. State lami's theorem.

Watch Video Solution

3. Expalin the motion of blocks connected by a string

(i) verticla motion

(ii) Horizontal motion

View Text Solution

4. Briefly explain the origin of friction show that in an inclined plane angle of friction is equal to angle of repose

Watch Video Solution

5. State newton three laws and discus their significance

Watch Video Solution

6. Explain the similarties and differences of centripetal and centrifugal forces

Watch Video Solution

7. Briefly explain centrifugal force with suitable examples

Watch Video Solution

8. What is meant by rolling friction ?

Watch Video Solution

9. Describe the method of measuring angle of repose

Watch Video Solution

10. What is the need of banking a circular raod

Watch Video Solution

11. Calculate the centripetal acceleration of moon towards the earth

Watch Video Solution

12. Prove the law of conservation of linear momentum use it to find the recoil velocity of a gun when a bullet is fired from it

Watch Video Solution

13. What are concurrent forces.

View Text Solution

14. Explain the motion of blocks connected by a string in (i) vertical motion (ii) horizontal motion .

Watch Video Solution

15. Briefly explain the origin of friction show that in an inclined plane angle of friction is equal to angle of repose

Watch Video Solution

16. State newton three laws and discus their significance

Watch Video Solution

17. Explain the similarties and differences of centripetal and centrifugal forces

Watch Video Solution

18. Briefly explain centrifugal force with suitable examples

Watch Video Solution

19. What is meant by rolling friction ?

Watch Video Solution

20. Describe the method of measuring angle of repose

Watch Video Solution

21. Explain the need for modulation.

Watch Video Solution

22. Calculate the centripetal acceleration of moon towards the earth

Watch Video Solution

Evaluation Textbook Questions Answers Iv Conceptual Question

1. Why is not possible to push a car from inside

Watch Video Solution

2. There is a limit beyong which the polishibng of a surface increases frictional resistance rather than decreasing it why

Watch Video Solution

3. Can a single isoloated force exist in nature explain your answer

Watch Video Solution

4. What does a Pacemaker do ?

Watch Video Solution

5. When walking on ice one should take short steps why ?

Watch Video Solution

6. When a person walks on surface the frictional force exerted by the surface on the person is opposite to the direction of motion true or false

Watch Video Solution

7. Can the coefficent of friction be more than one

Watch Video Solution

8. Can we predict the direction of motion of a body from the direction of force on it

Watch Video Solution

9. The angular momentum of a system of particles is conserved

Watch Video Solution

10. Why is not possible to push a car from inside

Watch Video Solution

11. There is a limit beyong which the polishibng of a surface increases frictional resistance rather than decreasing it why

Watch Video Solution

12. Can a single isoloated force exist in nature explain your answer

Watch Video Solution

13. Why do liquids diffuse very slowly in comparison to gases?

Watch Video Solution

14. When walking on ice one should take short steps why ?

Watch Video Solution

15. When a person walks on surface the frictional force exerted by the surface on the person is opposite to the direction of motion true or false

Watch Video Solution

16. Can the coefficent of friction be more than one

Watch Video Solution

17. Can we predict the direction of motion of a body from the direction of force on it

Watch Video Solution

18. The momentum of a system of particles is always conserved true or false

Watch Video Solution

Evaluation Textbook Questions Answers V Numerical Problems

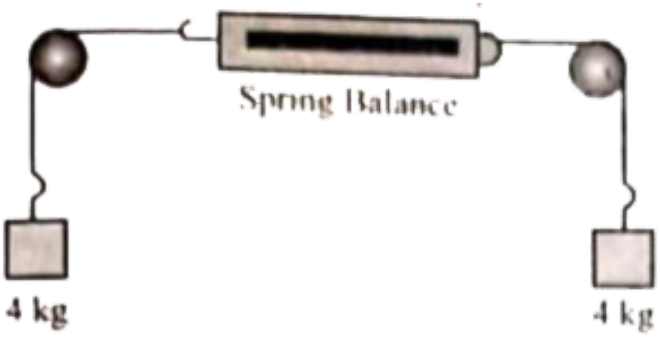
1. A force of 50 N act on the object of mass 20 kg calculate the acceleration of the object in x and y direction

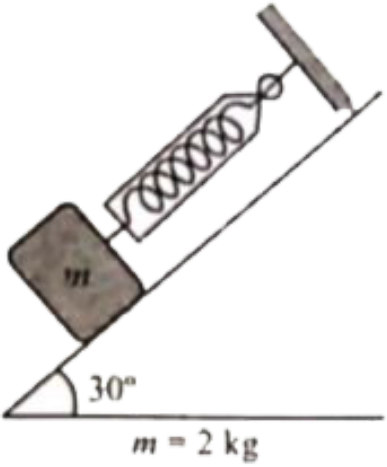
Watch Video Solution

2. A spider of mass 50 g is hanging on a string of a cob web as what is the tension in the string

Watch Video Solution

3. What is the reading shown in spring balance





Watch Video Solution

4. The physics books are stacked on each other in the sequence +1 and 2, +2 volumes 1 and 2 on a table identify the forces acting on each book and draw the free body diagram (b) Identify the forces exerted by each book on the other

Watch Video Solution

5. A bob attached to the string oscillates back and forth resolve the forces acting on the bob

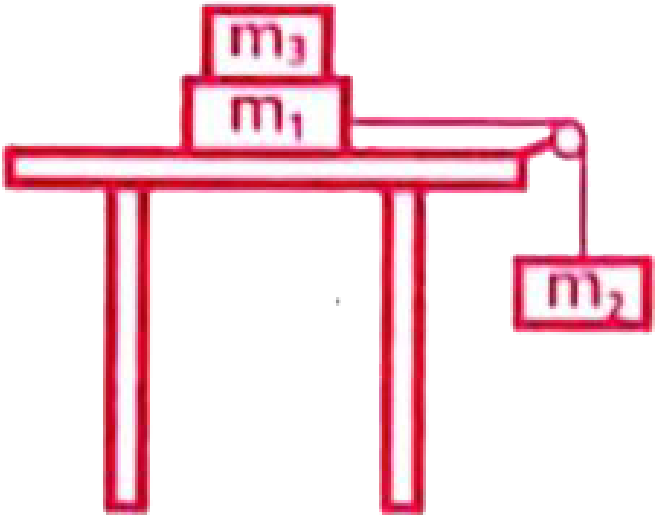
in to compents what is the acceleration experience by the bob at an angle θ

Watch Video Solution

6. Two masses m_1 and m_2 are connected with a string passing over a frictionless pulley fixed at the corner of the table as shown in the the coefficent of static friction of mass m_1 with the table is μ_s calculate the minium mass m_3 that may be placed on m_1 to prevent it from sliding check if

$m_1 = 15kgm_2 = 10kg, mm_3 = 25$ and

$\mu_s = 0.2$

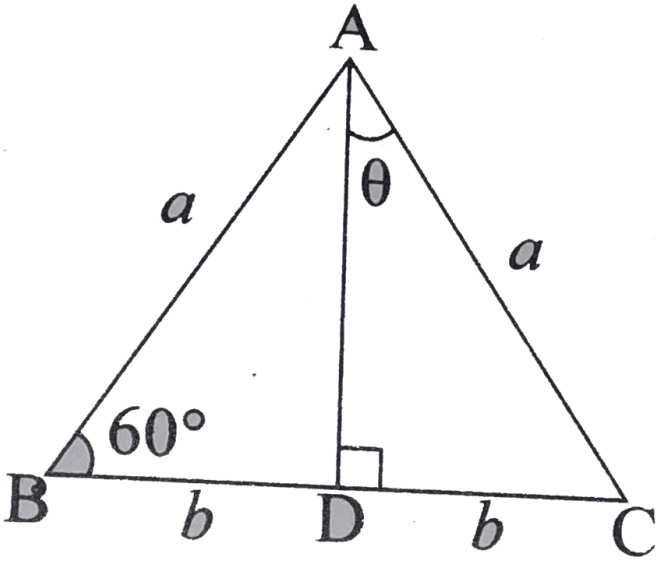


Watch Video Solution

7. Calculate the acceleration of the bicycle of mass 25 kg as

Watch Video Solution

8. In the given diagram θ is .....



Watch Video Solution

9. A football player kicks a 0.8 kg ball and imparts it a velocity $12ms^{-1}$ the contact

between the foot and ball is only for one sixtieth of a second find the average kicking force

Watch Video Solution

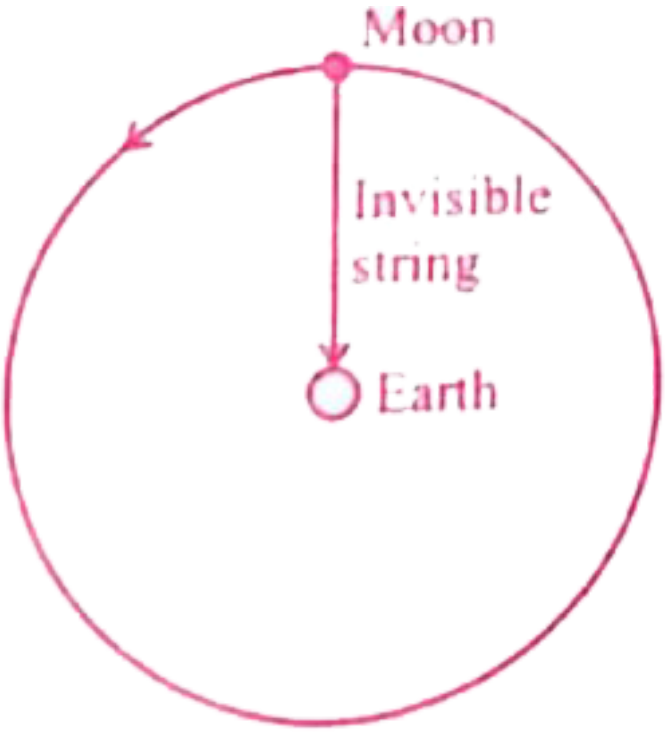
10. A stone of mass 2kg is attached to a string of length 1 meter the sting can withstand maximum tension 200 N what is the m maximum speed that stone can have during the whirling motion ?

Watch Video Solution

11. Imagine that the gravitational force between earth and moon is provided by an invisible string that exist between the moon and earth what is the tension that exists in this invisible string due to earth centripetal force

(Mass of the moon =$7.34 \times 10^{22} kg$ distance

between moon and earth $=3.84 \times 10^8$m)



Watch Video Solution

12. Two bodies of masses 15kg and 10 kg are connected with light string kept on a smooth

surface a horizontal force F=500 N is applied to a 15 kg as calculate the tension acting in the sting

Watch Video Solution

13. People often say for every action there is an equuivalent opposite reaction here they meant action of a human is it correct to apply newton third law to human action ? What is

meant by action in newton third law given your argument based on newton 's laws

Watch Video Solution

14. A car takes a turn with velocity 50 ms^{-1} on the circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car?

Watch Video Solution

15. A long stick rests on the surface a person standing 10 m away the stick with what minimum speed an object of masss 0.5 kg should he throuwn so that it hits the stick (Assume the coefficient of kinetic friction is 0.7)

Watch Video Solution

16. A force of 50 N act on the object of mass 20 kg calculate the acceleration of the object in x

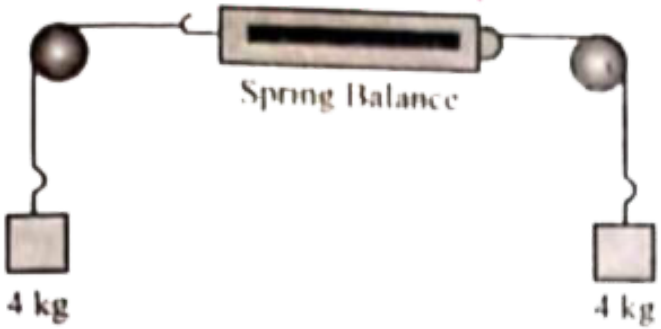
and y direction

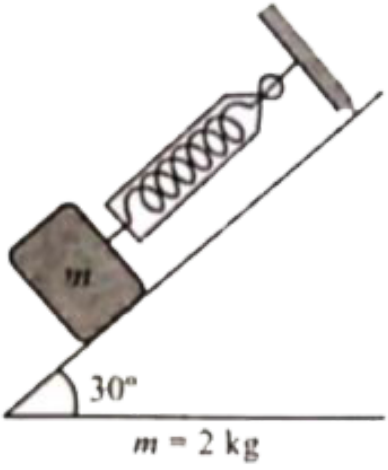
Watch Video Solution

17. A spider of mass 50 g is hanging on a string of a cob web as what is the tension in the string

Watch Video Solution

18. What is the reading shown in spring balance





Watch Video Solution

19. The physics books are stacked on each other in the sequence +1 and 2, +2 volumes 1 and 2 on a table identify the forces acting on each book and draw the free body diagram (b) Identify the forces exerted by each book on the other

Watch Video Solution

20. A bob attached to the string oscillates back and forth resolve the forces acting on the

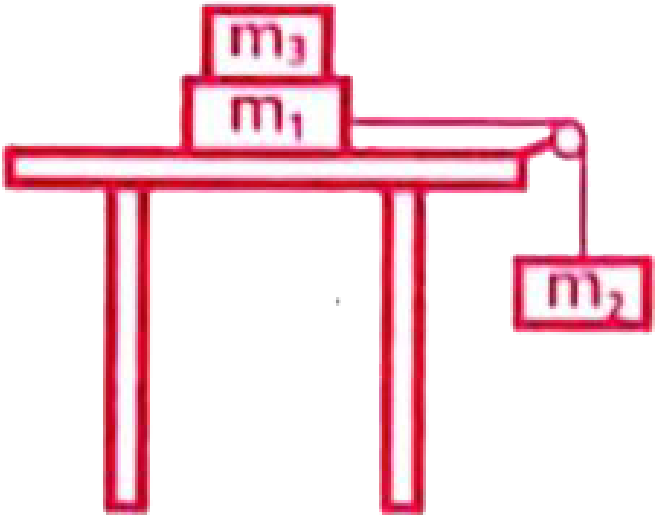
bob in to compents what is the acceleration experience by the bob at an angle θ

Watch Video Solution

21. Two masses m_1 and m_2 are connected with a string passing over a frictionless pulley fixed at the corner of the table as shown in the the coefficent of static friction of mass m_1 with the table is μ_s calculate the minium mass m_3 that may be placed on m_1 to prevent it from sliding check if

$m_1 = 15kgm_2 = 10kg, mm_3 = 25$ and

$\mu_s = 0.2$



Watch Video Solution

22. Calculate the acceleration of the bicycle of mass 25 kg as

Watch Video Solution

23. null

Watch Video Solution

24. A football player kicks a 0.8 kg ball and imparts it a velocity $12ms^{-1}$ the contact between the foot and ball is only for one sixtieth of a second find the average kicking force

Watch Video Solution

25. A stone of mass 2kg is attached to a string of length 1 meter the sting can withstand maximum tension 200 N what is the m

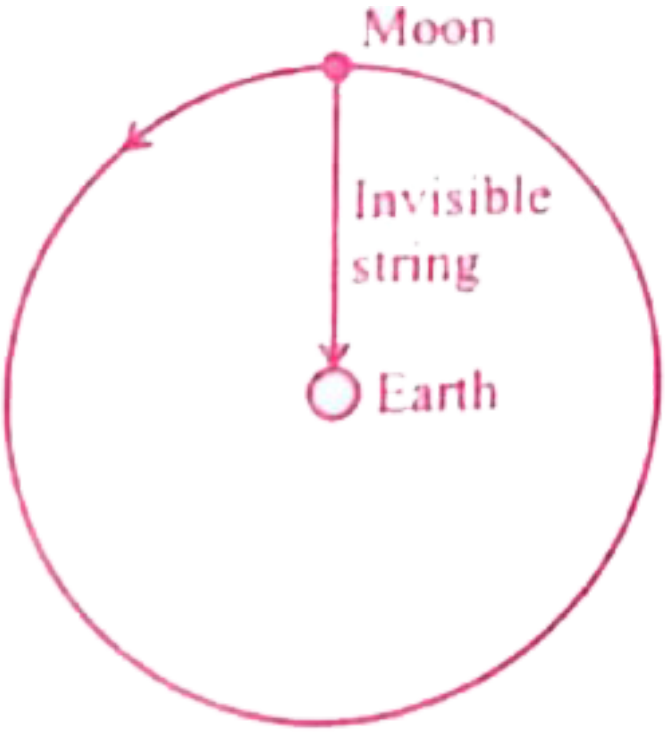
maximum speed that stone can have during the whirling motion ?

 Watch Video Solution

26. Imagine that the gravitational force between earth and moon is provided by an invisible string that exist between the moon and earth what is the tension that exists in this invisible string due to earth centripetal force

(Mass of the moon =$7.34 \times 10^{22} kg$ distance

between moon and earth =3.84×10^8m)



Watch Video Solution

27. Two bodies of masses 15kg and 10 kg are connected with light string kept on a smooth

surface a horizontal force F=500 N is applied to a 15 kg as calculate the tension acting in the sting

Watch Video Solution

28. People often say for every action there is an equuivalent opposite reaction here they meant action of a human is it correct to apply newton third law to human action ? What is

meant by action in newton third law given your argument based on newton 's laws

Watch Video Solution

29. A car takes a turn with velocity 50 ms^{-1} on the circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car?

Watch Video Solution

30. A long stick rests on the surface a person standing 10 m away the stick with what minimum speed an object of masss 0.5 kg should he throuwn so that it hits the stick (Assume the coefficient of kinetic friction is 0.7)

Watch Video Solution

Other Important Questions Answers Multiple Choice Questions

1. A man getting down a runnning bus falls forward

A. due to inertia of rest road is left behing and man reaches forward

B. due to inertia of motion upper part of body continue to be in motion in forward direction while feet come to rest as soon as they touch the road

C. as he leans forward as a matter of habit

D. due to the combined effect ofall the three factors states in (a),(b)and (c)

Answer: b

Watch Video Solution

2. Choose the correct statement of the following.

A. unable to change by itself the state of rest

B. unable to change by itself the state of uniform motion

C. unable to change by itself the direction of motion

D. unable to change by itself the state of rest and of uniform linear motion

Answer: d

Watch Video Solution

3. Physical independence of force is a consequence of

A. third law of motion

B. second law of motion

C. first law of motion

D. all the above

Answer: c

 Watch Video Solution

4. Select the correct statement for the given situation

A. rider is taken bqack

B. rider is suddenly afraid of falling

C. inertia of rest keeps the upper part of body at rest wheras lower part of the body moves forward with the horse

D. none of these

Answer: c

View Text Solution

5. Newton 's first law of motion describes the following

A. energy

B. work

C. inertia

D. moment of inertia

Answer: c

 Watch Video Solution

6. Which of the following is not an illustration of newton 's third law

A. flight of a jet plane

B. a cricket player lowering his hands while catching a cricket ball

C. walking on floor

D. rebouncing of a rubber plane

Answer: b

Watch Video Solution

7. Newton 's second law gives the measures of

A. acceleartion

B. force

C. momentum

D. angular momentum

Answer: b

Watch Video Solution

8. Select the odd man out from the following laws

A. newton first law of mtion

B. newton 's third law of motion

C. newton 's law of gravitation

D. newton 's second law of motion

Answer: c

Watch Video Solution

9. Swimming is possible on account of

A. first law of mtion

B. second law of mtion

C. third law of mtion

D. newton 's law of gravition

Answer: c

Watch Video Solution

10. Select the correct reason for the uplift of a jet plane A jet plane moves up in air because

A. the gravity does not act on bodies moving with high speeds

B. the thrust of the jet compensates for the force of gravity

C. the flow of air around the wings causes an upward force4 whcihc compensates for the force of gravity

D. the weight of air whose volume is equal to the volume of the plane is more than the weight of the plane

Answer: b

Watch Video Solution

11. Select the correct cause for the given situation when a horse pulls a wagon the force that causes the horse to move forward is the force

A. the ground exerts on him

B. he exerts on the ground

C. the wagon exerts on him

D. he exerts on the wagon

Answer: b

Watch Video Solution

12. Assertion : No force is required to move a body uniformly along a straight line .

Reason : Because F=ma=m(0)=0.

A. an object moving in straight line with constant velocity

B. an object moving in circular motion

C. an object moving with constant acceleration

D. an object moving in elliptical path

Answer: a

Watch Video Solution

13. A book is lying on the table what is the angle between the action of the book on the table and the reaction of the table on the book

A. 0°

B. 45°

C. 90°

D. 180°

Answer: d

View Text Solution

View Text Solution

14. Which one of the following is not a force

A. impulse

B. tension

C. thrust

D. weight

Answer: a

Watch Video Solution

15. Match the following laws or theorem given in column 1 and the facts given in column

Column I	Column II
1. Newton's first law	(i) $\frac{\lvert\vec{F}_1\rvert}{\sin\alpha} = \frac{\lvert\vec{F}_2\rvert}{\sin\beta} = \frac{\lvert\vec{F}_3\rvert}{\sin\gamma}$
2. Newton's second law	(ii) Propulsion of a rocket
3. Lami's theorem	(iii) Motion of a body on an inclined plane
4. Newton's third law	(iv) Force
	(v) Momentum
	(vi) Inertia

A. 1-(i),2(iii),3-(ii),4-(v)

B. 1-(vi),-(iv),3-(i),4-(ii)

C. 1-(iv),2-(iii),3-(v),4-(i)

D. 1-(vi),2-(i),3-(v),47-(vi)

Answer: b

Watch Video Solution

16. Which concept was given by newton 's first law of motion ?

A. force

B. weight

C. work

D. inertia

Answer: d

Watch Video Solution

17. Which of the following laws gives a method of measuring force ?

A. newton 's first of motion

B. newton 's second law of mtion

C. newton 's third law of motion

D. none

Answer: b

Watch Video Solution

18. The law of conservation of momentum can be derived from

A. newton 's first law of motion

B. newton 's second law of motion

C. newton 's third law of mtion

D. all of these laws

Answer: c

Watch Video Solution

19. While walking the vertical component of reactive force balances our

A. force

B. mass

C. weight

D. impulse

Answer: c

View Text Solution

20. Which of the following forces tends to stop the moving object

A. frictional force acting on the vehicle is along negative x direction

B. magnetic force

C. gravitational force

D. electric force

Answer: a

Watch Video Solution

21. In the following situatin select the correct pair of the following pairs first law of newton deals with the

A. concept of inertia and momentum

B. definition of force and work

C. concept of momentum and torque

D. concept of iunertia and definition of force

Answer: d

Watch Video Solution

22. Second law of newton gives the definition of force

A. fundamental

B. quantiative

C. dimensional

D. both b and c

Answer: d

Watch Video Solution

23. Third law of newton explains the concept of

A. inertia of direction

B. momentum

C. torque

D. nature of the force

Answer: d

Watch Video Solution

24. Define inertia. Give its classification.

A. four

B. three

C. two

D. many

Answer: b

Watch Video Solution

25. A book lying on the table continues in its state of rest unless an external force acts on it it id due to

A. inertia of rest

B. inertia of motion

C. inertia of direction

D. both b and c

Answer: a

Watch Video Solution

26. Select the correct pair in the following situation

An anthlete running in a race will continue to

run even after reaching the finishing point it is due to

A. inetia of rest and force

B. inertia of mtion and retardation

C. inertia of direction and acceleration

D. inertia of direction and motion

Answer: d

Watch Video Solution

27. Assuming earth to be an inertial frame an example for inertial frame observer is

A. a driver in a train which is slowing down to stip

B. a person in a car moving with uniform velocity

C. a girl revolving in a merrry go round

D. a passenger in an aircraft which is taking off

Answer: b

Watch Video Solution

28. Which one of the following motions on a smooth plane surface does not involve force

A. accereated motion in a straight line

B. retarded motion is a straight line

C. motion with constant momentum along a straight line

D. motion along a stright line with varying velocity

Answer: c

View Text Solution

29. Which of the following pairings is correct ?

A. newton 's seond law and law of conservation of momentum

B. newton 's thrid law and law of conservation of momentum

C. newton 's first law and law of conservation of anglular momentum

D. newton third law lof conservation of angular momentum

Answer: b

Watch Video Solution

30. Which one of the following statement is incorrect statement

A. concurrent forces act at a common point

B. concurrent forces are forces

C. concurrent forces act in the same plane

D. concurrent forces are a collection of forces

Answer: c

Watch Video Solution

31. If a body acquires an acceleration of $2ms^{-2}$ under the action of a force $\vec{F} = 6\vec{i} - 8\vec{j} + 10\vec{k}$ then its mass is

A. $10\sqrt{2}$kg

B. $5\sqrt{2}$ kg

C. $20\sqrt{2}$ kg

D. $2\sqrt{2}$ kg

Answer: b

Watch Video Solution

32. A block P is pushed momentarily along a horizontal surface with an initial velocity u if μ is the coefficient of sliding friction betweeen p and the horizontal surface then calculate the time taken by the block to attain the state of rest

A. $g\mu$

B. $\frac{u}{\mu g}$

C. $\mu u g$

D. $\frac{\mu}{g}$

Answer: b

Watch Video Solution

33. Which one of the following statement is correct

When the speed of a moving body is doubled

A. its acceleartio is doubled

B. its momentum is doubled

C. its kinetic energy is doubled

D. its petential energy is doubled

Answer: b

Watch Video Solution

34. Which of the following statement is correct

A. 1 newton =1kg ms^5

B. 1 newton = 10^5 dyne

C. 1 dyne = g cm s^2

D. all the above

Answer: d

Watch Video Solution

35. A jet engine works on the principal of

A. conservation of linear momentum

B. conservation of mass

C. conservation of energy

D. conservation of angular momentum

Answer: a

Watch Video Solution

36. Which of the following pairs is correct pair ?

A. linear momenutm and angular momentum

B. angualr momentum and force

C. potential energy and linear momentum

D. kinetic energy and linear momentum

Answer: a

View Text Solution

37. When a body moves along a rough horizontal surface which of the following formula is incorrect

A. retardation $a = \frac{f}{m} = \mu g$

B. force of friction $f = \mu R = \mu m g$

C. work done against friction $W = \tau \times s$

D. power p = f x v = $\mu m g v$

Answer: c

View Text Solution

38. What is the dimensional formula for impluse

A. ML^2T^{-1}

B. MLT^{-2}

C. MLT^{-1}

D. $M^0L^{-1}T^{-1}$

Answer: c

Watch Video Solution

39. A body rolled on ice with a velocity of $8ms^{-1}$ comes to rest after traveling a distance of 4m for this situation which of the following pair is correct

A. acceleration =+8 ms^{-2} coefficient of friction =0.8

B. aqcceleration =+4 ms^{-2} coeffiecient of friction =0.4

C. accelearation =-8 ms^{-2} coefficient fo friction =0.816

D. acceleartion =-16ms^2 coefficent of friction =1.62

Answer: c

Watch Video Solution

40. SI unit of impulse is _____

A. $kgms^{-1}$

B. kgs^{-1}

C. kg^2ms^{-1}

D. $kgm^{-1}s^{-1}$

Answer: a

Watch Video Solution

41. The force required to stop a moving object depends on its

A. mass alone

B. velocity alone

C. mass or velocity

D. mass and velocity

Answer: d

 Watch Video Solution

42. For bodies of same momenta their velocities are

A. directly proportional to their acceleration

B. inversely proportinal to their masses

C. directly proportional to their masses

D. inverslely proportional ot their forces

Answer: b

Watch Video Solution

43. According to the conservation linear momentlum which one of the following statement is correct

A. momentum before impact = meontum after imapcat

B. momentum before impact $>$ momentum after impact

C. momentum before impact $<$ momentum after impact

D. momentum before impact is inversely proportional to momentum after impact

Answer: a

 Watch Video Solution

44. Three blocks masses 4kg 6kg and 8kg are connected by a string they are placed on a frictionless surface if the system is pulled by a force of F=36 N then acceleration of the body

is a = and tension acting on the sting is T=

Which of the following pair is correct

A. $a = 4m/s^2, T = 14N$

B. $a = 8m/s^2, T = 7N$

C. $a = 16m/s^2, T = 196N$

D. $a = 4m/s^2, T = 28N$

Answer: d

Watch Video Solution

45. A force system is said to be concurrent id the lines of all forces

A. intersect at a common point

B. intersect at a common point in equal angles

C. intersect at a common point in common plane

D. none of these

Answer: a

Watch Video Solution

46. An explosion breaks a rock into three parts in a horizontal plane two of them go off at right angles to each other the first part of mass 1 kg moves with a speed of 12 m/s the second part of mass 2kg moves with a speed of 8 m/s and the third aprt flies off with a speed of 4 m/s calculate the mass of third part

A. 10 kg

B. 2.5 kg

C. 4 kg

D. 5 kg

Answer: d

Watch Video Solution

47. Which of the followng pair is correct with respect to the dimensions of two quantities having same dimentions ?

A. force and momentum

B. implulse and momentum

C. impulse and work

D. force and power

Answer: b

 Watch Video Solution

48. The recoil velocity of a 4kg rifle that shoots a bullet of mass 0.05 kg at a apeed 280 ms^{-1} is

A. $\sqrt{3.5}ms^{-1}$

B. $3.5ms^{-1}$

C. $-3.5ms^{-1}$

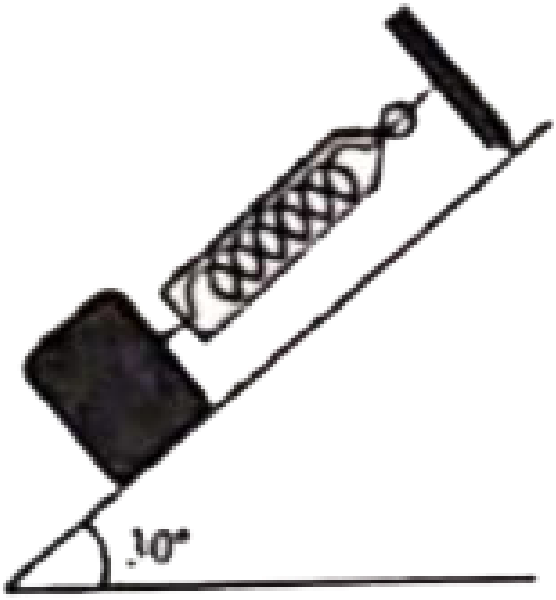
D. $-\sqrt{3.5}ms^{-1}$

Answer: c

Watch Video Solution

49. A body of mass 5kg is suspended by a spring balance on an inclined plane as shown in the figure. the spring balance measures

$\left[g = 10\frac{m}{s^2}\right]$



A. 50 N

B. 25 N

C. 500 N

D. 10 N

Answer: b

Watch Video Solution

50. A body of imparted motion from rest to move in a straight line if it is then obstructed by an opposite force then

A. the body will necessarilly change direction

B. the body is sure to slow down

C. the body will necessarily continue to move in the same direction at the saem speed

D. none of these

Answer: b

Watch Video Solution

51. If the mnormal force is doubled then coefficient of friction is

A. halved

B. tripled

C. doubled

D. not changed

Answer: c

Watch Video Solution

52. A block has been placed on an inclined plane with the slope angle θ block slides down

the plane at constant speed the coefficient of kinetic friction is equal to

A. $\sin\theta$

B. $\cos\theta$

C. g

D. $\tan\theta$

Answer: d

Watch Video Solution

53. From the fololwing factors choose the odd man out

A. static friction

B. kinetic friction

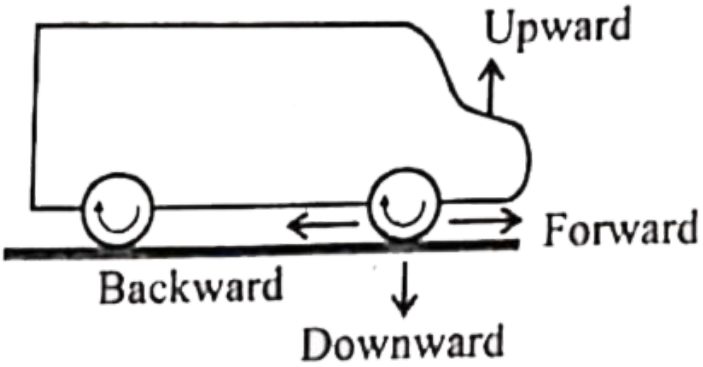
C. impulse friction

D. rolling friction

Answer: c

Watch Video Solution

54. Direction of frictional force between wheel of the car and road is



A. upward

B. forward

C. backward

D. downward

Answer: b

Watch Video Solution

55. Which of the following is the dimension of coefficient of friction

A. MLT^{-2}

B. $M^0L^0T^0$

C. M^2LT^{-2}

D. M^2LT

Answer: b

Watch Video Solution

56. If μ_s is coefficient of static friction and μ_k is coefficent of kinetic friction then

A. there is no relation between μ_s and μ_k

B. general,ly $\mu_s > \mu_k$

C. generally $\mu_s = \mu_k$

D. generally $\mu_s < m, u_k$

Answer: b

Watch Video Solution

57. For a car not to turn safely on a curved raod

A. speed is slow

B. distance between tyres is large

C. centre of gravity for car is low

D. low friction force

Answer: d

Watch Video Solution

58. A body of mass m slides down a rough plane of uinclination α if μ is the coefficent of friction then acceleratio of the body will be

A. $g \sin \alpha$

B. $\mu \cos \alpha$

C. $g(\sin \alpha - \mu \cos \alpha)$

D. $g(\cos \alpha - \mu \sin \alpha)$

Answer: c

Watch Video Solution

59. Which one of the following statement is a correct statement

When two surfaces are coated with a lubricant then they

A. stick to each other

B. slide upon each other

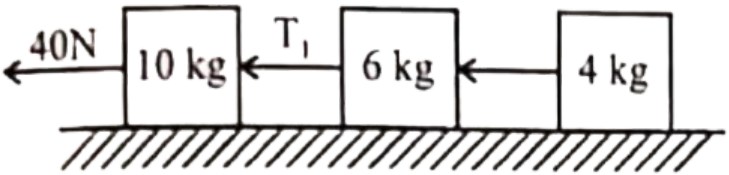
C. roll upon each other

D. none of these

Answer: b

Watch Video Solution

60. A 40N force pulls a system of three masses on a horizontal frictionless surface the value of tension T_1 is



A. 10 N

B. 20 N

C. 30 N

D. 40 N

Answer: b

Watch Video Solution

61. An object placed on an inclined plane starts sliding when the angle of incline becomes 30° the coefficent of statyic friction between the object and the plane is

A. $\frac{1}{\sqrt{3}}$

B. $\sqrt{3}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

Answer: a

Watch Video Solution

62. A boy presses a book against the front wall such that the book do not move the force of friction between the wall and the book is

A. towards right

B. towards left

C. downwards

D. upwards

Answer: d

Watch Video Solution

63. A cyclist travels with a speed of $36km^{-1}$ if the angle of inclinatio with vertical is 45° while he goes around a circle then the radius of the circle is

A. 7m

B. 10 m

C. 5.5 m

D. 20 m

Answer: b

Watch Video Solution

64. Identify the correct statement

A. static friction depends on the area of contact

B. kinetic friction depends on the area of contact

C. coefficient of static friction does not depend on the surfaces in contact

D. coefficient of kinetic friction is less than the coefficeint of static friction

Answer: d

Watch Video Solution

65. A particle revolves round a circular path the acceleration of the particle is inversely proportional to

A. radius

B. velocity alone

C. mass of particle

D. both b and c

Answer: a

Watch Video Solution

66. When milk is churned cream gets separated due to

A. centripetal force

B. centrifugal force

C. frictional force

D. gravitational force

Answer: b

Watch Video Solution

67. Statement 1 represent assertion And statement 2 represents reason which one of the following is correct

Statement 1 The driver in a car moving with a constant speed on a straight road is non inertial frame of reference

Statement 2 A frame of reference in which newton 's laws of motion are applicable is a non inertial frame

A. statement 1 is true and statement 2 is false

B. statement 1 is false and statement 2 is true

C. statement 1 is false and statemetn 2 is false

D. statement 1 is true and statement 2 is true and it explains statement 1

Answer: c

 Watch Video Solution

68. A body is moving in a circular path with acceleration a if its velocity gets doubled find the ratio acceleration after and before the change

A. $1:4$

B. $\frac{1}{4}:1$

C. $2:1$

D. $4:1$

Answer: d

Watch Video Solution

69. Assertion : on a rainy day it is difficult to drive a bus at high speed

Reason : Due to wetting of the surface the value of coefficient of friction is lowered Which one of the following statement is a correct statement

A. Assertion is true and reasoin is false

B. Assertion is true but reason does not explain assertion

C. Assertion is true and reason expalins assertin

D. Assertion is true reason is also true

Answer: d

Watch Video Solution

70. For the following situation which of the following is correct

When a car takes a turn on the road the centripetal force is provided by

A. weight of the car

B. gravitational force

C. the frictional force between the tyres and the road

D. all the above

Answer: c

Watch Video Solution

71. Assertion : Usage of ball bearing between two moving parts in a machine is a common practice

Reason : Ball bearing reduce vibrations and provide good stability

Which one of the following statement is a correct statement

A. assertion is true and reason is true and explains assertion

B. assertion is true and reason explain assertion

C. assertion is true and reason is false

D. assertion is false and reason is true

Answer: c

Watch Video Solution

72. Which one of the following statement is correct for the following situation

Assertion : Frictional forces are conservative

forces

Reason : Potential energy is associated with frictional forces

A. assertion is true and reason is false

B. assertion is false and reason is true

C. assertion is false and reason is false

D. assertion is true and reson is true

Answer: c

 Watch Video Solution

73. Which of the following is a correct statement when a car is moving as follows when a car is turning round a corner the person sitting inside the car

A. may fall dwon experiences a force

B. experiences a force

C. experiences an inward force

D. experiences outward force

Answer: d

Watch Video Solution

74. When a stone tied to the end of a string whireled in a circular path the centripetal force is provided by the

A. weight of the stone

B. centrifugal force

C. tension in the string

D. weight of the string

Answer: c

 Watch Video Solution

75. The condition for skidding is

A. $\tan\theta = \mu$

B. $\tan\theta < \mu$

C. $\tan\theta > \mu$

D. $\tan\theta = 0$

Answer: c

Watch Video Solution

76. A body is moving with a constant speed v in a circle of radius r. its angualr acceleration is :

A. vr

B. $\frac{v}{r}$

C. zero

D. $\frac{v}{r^3}$

Answer: c

Watch Video Solution

77. Which one of the following statement is correct for the following situation

Assertion : A man in a closed cabin which is falling freely does not experience gravitational force

Reason: Inertial mass is equal to gravitational mass

A. assertion is true but reason is false

B. assertion is false but reason is true

C. assertion is true but reason is true and explains assertion correctly

D. assertion is true reson is true but does not explain assertion correctly

Answer: d

 Watch Video Solution

78. Select the odd man out from the following statement

A. centrifugal force is a pseudo force

B. centrifugal force is may be found in inertial frames

C. centrifugal force acts away from the centre of circulators path

D. centrifugal force acts only in rotating frames

Answer: b

 Watch Video Solution

79. When a particle is in uniform motion it does not have

A. radial velocity and radial acceleation

B. radial velocity and trasverse acceleration

C. transverse velocity and radial acceleration

D. transverse velcoity and transverse acceleartion

Answer: b

Watch Video Solution

80. Which of the following pairs is a correct pair A particle revolves round a circular path the acceleration of the particle is

A. along the circumference of the circle and $a = \frac{v^2}{m}$

B. along the tangent and v= ar

C. along the radius and $a = \frac{v^2}{r}$

D. zero and velocity is zero

Answer: c

Watch Video Solution

81. A man getting down a runnning bus falls forward

A. due to inertia of rest road is left behing and man reaches forward

B. due to inertia of motion upper part of body continue to be in motion in

forward direction while feet come to rest as soon as they touch the road

C. as he leans forward as a matter of habit

D. due to the combined effect ofall the three factors states in (a),(b)and (c)

Answer: b

Watch Video Solution

82. Choose the correct statement of the following.

A. unable to change by itself the state of rest

B. unable to change by itself the state of uniform motion

C. unable to change by itself the direction of motion

D. unable to change by itself the state of rest and of uniform linear motion

Answer: d

 Watch Video Solution

83. Physical independence of force is a consequence of

A. third law of motion

B. second law of motion

C. first law of motin

D. all the above

Answer: c

Watch Video Solution

84. Select the correct statement for the given situation

A. rider is taken bqack

B. rider is suddenly afraid of falling

C. inertia of rest keeps the upper part of body at rest wheras lower part of the body moves forward with the horse

D. none of these

Answer: c

View Text Solution

85. Newton 's first law of motion describes the following

A. energy

B. work

C. inertia

D. moment of inertia

Answer: c

Watch Video Solution

86. Which of the following is not an illustration of newton 's third law

A. flight of a jet plane

B. a cricket player lowering his hands while catching a cricket ball

C. walking on floor

D. rebouncing of a rubber plane

Answer: b

Watch Video Solution

87. Newton 's second law gives the measures of

A. impulse

B. force

C. momentum

D. angular momentum

Answer: b

Watch Video Solution

88. Select the odd man out from the following laws

A. newton first law of mtion

B. newton 's third law of motion

C. newton 's law of gravitation

D. newton 's second law of motion

Answer: c

Watch Video Solution

89. Swimming is possible on account of

A. first law of mtion

B. second law of mtion

C. third law of mtion

D. newton 's law of gravition

Answer: c

Watch Video Solution

90. Select the correct reason for the uplift of a jet plane A jet plane moves up in air because

A. the gravity does not act on bodies moving with high speeds

B. the thrust of the jet compensates for the force of gravity

C. the flow of air around the wings causes an upward force4 whcihc compensates for the force of gravity

D. the weight of air whose volume is equal to the volume of the plane is more than the weight of the plane

Answer: b

Watch Video Solution

91. Select the correct cause for the given situation when a horse pulls a wagon the force that causes the horse to move forward is the force

A. the ground exerts on him

B. he exerts on the ground

C. the wagon exerts on jhim

D. he exerts on the wagon

Answer: b

Watch Video Solution

92. No force is required for

A. an object moving in straight line with constant velocity

B. an object moving in circular motion

C. an object moving with constant acceleration

D. an object moving in elliptical path

Answer: a

View Text Solution

93. A book is lying on the table what is the angle between the action of the book on the table and the reaction of the table on the book

A. 0°

B. 45°

C. 90°

D. 180°

Answer: d

Watch Video Solution

Watch Video Solution

94. Which one of the following is not a force

A. impulse

B. tension

C. thrust

D. weight

Answer: a

Watch Video Solution

95. Match the following laws or theorem given in column 1 and the facts given in column

Column I	Column II
1. Newton's first law	*(i)* $\frac{\lvert\vec{F}_1\rvert}{\sin\alpha} = \frac{\lvert\vec{F}_2\rvert}{\sin\beta} = \frac{\lvert\vec{F}_3\rvert}{\sin\gamma}$
2. Newton's second law	*(ii)* Propulsion of a rocket
3. Lami's theorem	*(iii)* Motion of a body on an inclined plane
4. Newton's third law	*(iv)* Force
	(v) Momentum
	(vi) Inertia

A. 1-(i),2(iii),3-(ii),4-(v)

B. 1-(vi),-(iv),3-(i),4-(ii)

C. 1-(iv),2-(iii),3-(v),4-(i)

D. 1-(vi),2-(i),3-(v),47-(vi)

Answer: b

Watch Video Solution

96. Which concept was given by newton 's first law of motion ?

A. force

B. weight

C. work

D. inertia

Answer: d

Watch Video Solution

97. Which of the following laws gives a method of measuring force ?

A. newton 's first of motion

B. newton 's second law of mtion

C. newton 's third law of motion

D. none

Answer: b

Watch Video Solution

98. The law of conservation of momentum can be derived from

A. newton 's first law of motion

B. newton 's second law of motion

C. newton 's third law of mtion

D. all of these laws

Answer: c

Watch Video Solution

99. While walking the vertical component of reactive force balances our

A. force

B. mass

C. weight

D. impulse

Answer: c

View Text Solution

100. Which of the following forces tends to stop the moving object

A. frictional force acting on the vehicle is along negative x direction

B. magnetic force

C. gravitational force

D. electric force

Answer: a

Watch Video Solution

101. In the following situatin select the correct pair of the following pairs first law of newton deals with the

A. concept of inertia and momentum

B. definition of force and work

C. concept of momentum and torque

D. concept of inertia and definition of force

Answer: d

Watch Video Solution

102. Second law of newton gives the definition of force

A. fundamental

B. quantiative

C. dimensional

D. both b and c

Answer: d

Watch Video Solution

103. Third law of newton explains the concept of

A. inertia of direction

B. momentum

C. torque

D. nature of the force

Answer: d

Watch Video Solution

104. Inertia is of types

A. four

B. three

C. two

D. many

Answer: b

Watch Video Solution

105. A book lying on the table continues in its state of rest unless an external force acts on it it id due to

A. inertia of rest

B. inertia of motion

C. inertia of direction

D. both b and c

Answer: a

Watch Video Solution

106. Select the correct pair in the following situation

An anthlete running in a race will continue to

run even after reaching the finishing point it is due to

A. inetia of rest and force

B. inertia of mtion and retardation

C. inertia of direction and acceleration

D. inertia of direction and motion

Answer: d

Watch Video Solution

107. Assuming earth to be an inertial frame an example for inertial frame observer is

A. a driver in a train which is slowing down to stip

B. a person in a car moving with uniform velocity

C. a girl revolving in a merrry go round

D. a passenger in an aircraft which is taking off

Answer: b

Watch Video Solution

108. Which one of the following motions on a smooth plane surface does not involve force

A. accereated motion in a straight line

B. retarded motion is a straight line

C. motion with constant momentum along a straight line

D. motion along a stright line with varying velocity

Answer: c

View Text Solution

109. Which of the following paris is a correct pair

A. newton 's second law and law of conservation of momentum

B. newton 's third law and law of conservation of momentum

C. newton 's first law and law of conservation of angular momentum

D. newton 's third and law of conservation of angular momentum

Answer: b

Watch Video Solution

110. Which one of the following statement is incorrect statement

A. concurrent forces act at a common point

B. concurrent forces are forces

C. concurrent forces act in the same plane

D. concurrent forces are a collection of forces

Answer: c

Watch Video Solution

111. If a body acquires an acceleration of $2ms^{-2}$ under the action of a force $\vec{F} = 6\vec{i} - 8\vec{j} + 10\vec{k}$ then its mass is

A. $10\sqrt{2}$kg

B. $5\sqrt{2}$ kg

C. $20\sqrt{2}$ kg

D. $2\sqrt{2}$ kg

Answer: b

Watch Video Solution

112. A block P is pushed momentarily along a horizontal surface with an initial velocity u if μ is the coefficient of sliding friction betweeen p and the horizontal surface then calculate the time taken by the block to attain the state of rest

A. $g\mu$

B. $\frac{u}{\mu g}$

C. $\mu u g$

D. $\frac{\mu}{g}$

Answer: b

Watch Video Solution

113. Which one of the following statement is correct

When the speed of a moving body is doubled

A. its acceleartio is doubled

B. its momentum is doubled

C. its kinetic energy is doubled

D. its petential energy is doubled

Answer: b

Watch Video Solution

114. Which of the following statement is correct

A. 1 newton =1kg ms^{-2}

B. 1 newton = 10^5 dyne

C. 1 dyne = g cm s^{-2}

D. all the above

Answer: d

Watch Video Solution

115. A jet engine works on the principal of

A. conservation of linear momentum

B. conservation of mass

C. conservation of energy

D. conservation of angular momentum

Answer: a

Watch Video Solution

116. Which of the following pairs is correct

A. linear momenutm and angular momentum

B. angualr momentum and force

C. potential energy and linear momentum

D. kinetic energy and linear momentum

Answer: a

Watch Video Solution

117. When person cycling on rough horizontal surface then which of the following are correct

A. retardation $a = \frac{f}{m} = \mu g$

B. force of friction $f = \mu R = \mu m g$

C. work done against friction $W = \tau \times s$

D. power p = f x v = $\mu m g v$

Answer: c

Watch Video Solution

118. What is the dimensional formula for impluse

A. ML^2T^{-1}

B. MLT^{-2}

C. MLT^{-1}

D. $M^0L^{-1}T^{-1}$

Answer: c

Watch Video Solution

119. A body rolled on ice with a velocity of $8ms^{-1}$ comes to rest after traveling a distance of 4m for this situation which of the following pair is correct

A. acceleration =+8 ms^{-2} coefficient of friction =0.8

B. aqcceleration =+4 ms^{-2} coeffiecient of friction =0.4

C. accelearation =-8 ms^{-2} coefficient fo friction =0.816

D. acceleartion =-$16ms^2$ coefficent of friction =1.62

Answer: c

Watch Video Solution

120. SI unit of impulse is _____

A. $kgms^{-1}$

B. kgs^{-1}

C. kg^2ms^{-1}

D. $kgm^{-1}s^{-1}$

Answer: a

Watch Video Solution

121. The force required to stop a moving object depends on its

A. mass alone

B. velocity alone

C. mass or velocity

D. mass and velocity

Answer: d

 Watch Video Solution

122. For bodies of same momenta their velocities are

A. directly proportional to their acceleration

B. inversely proportinal to their masses

C. directly proportional to their masses

D. inverslely proportional ot their forces

Answer: b

Watch Video Solution

123. According to the conservation linear momentlum which one of the following statement is correct

A. momentum before impact = meontum after imapcat

B. momentum before impact $>$ momentum after impact

C. momentum before impact $<$ momentum after impact

D. momentum before impact is inversely proportional to momentum after impact

Answer: a

Watch Video Solution

124. Three blocks masses 4kg 6kg and 8kg are connected by a string they are placed on a frictionless surface if the system is pulled by a force of F=36 N then acceleration of the body is a = and tension acting on the sting is T= Which of the following pair is correct

A. $a = 4m/s^2, T = 14N$

B. $a = 8m/s^2, T = 7N$

C. $a = 16m/s^2, T = 196N$

D. $a = 4m/s^2, T = 28N$

Answer: d

Watch Video Solution

125. A force system is said to be concurrent id the lines of all forces

A. intersect at a common point

B. intersect at a common point in equal angles

C. intersect at a common point in common plane

D. none of these

Answer: a

Watch Video Solution

126. An explosion breaks a rock into three parts in a horizontal plane two of them go off at right angles to each other the first part of mass 1 kg moves with a speed of 12 m/s the

second part of mass 2kg moves with a speed of 8 m/s and the third aprt flies off with a speed of 4 m/s calculate the mass of third part

A. 10 kg

B. 2.5 kg

C. 4 kg

D. 5 kg

Answer: d

Watch Video Solution

127. Which of the followng pair is correct with respect to the dimensions of two quantities having same dimentions ?

A. force and momentum

B. implulse and momentum

C. impulse and work

D. force and power

Answer: b

Watch Video Solution

128. The recoil velocity of a 4kg rifle that shoots a bullet of mass 0.05 kg at a apeed 280 ms^{-1} is

A. $\sqrt{3.5}ms^{-1}$

B. $3.5ms^{-1}$

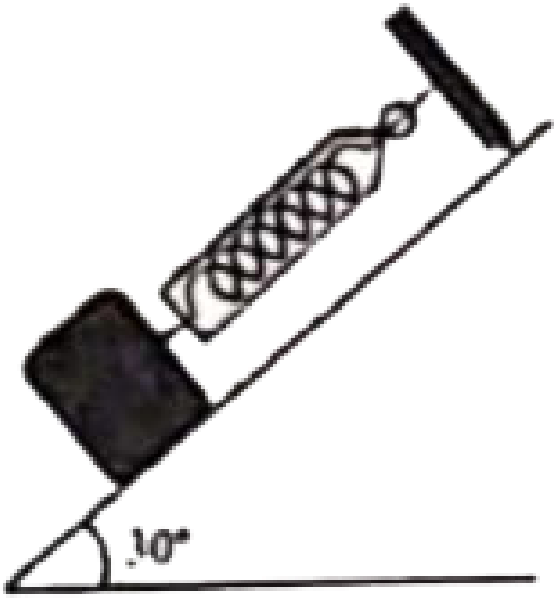
C. $-3.5ms^{-1}$

D. $-\sqrt{3.5}ms^{-1}$

Answer: c

Watch Video Solution

129. A body of mass 5kg is suspended by a spring balance on an inclined plane as shown in the figure. the spring balance measures $\left[g = 10\frac{m}{s^2}\right]$



A. 50 N

B. 25 N

C. 500 N

D. 10 N

Answer: b

Watch Video Solution

130. A body of imparted motion from rest to move in a straight line if it is then obstructed by an opposite force then

A. the body will necessarilly change direction

B. the body is sure to slow down

C. the body will necessarily continue to move in the same direction at the saem speed

D. none of these

Answer: b

Watch Video Solution

131. If the mnormal force is doubled then coefficient of friction is

A. halved

B. tripled

C. doubled

D. not changed

Answer: c

 Watch Video Solution

132. A block has been placed on an inclined plane with the slope angle θ block slides down the plane at constant speed the coefficient of kinetic friction is equal to

A. $\sin\theta$

B. $\cos\theta$

C. g

D. $\tan\theta$

Answer: d

 Watch Video Solution

133. From the followlwing factors choose the odd man out

A. static friction

B. kinetic friction

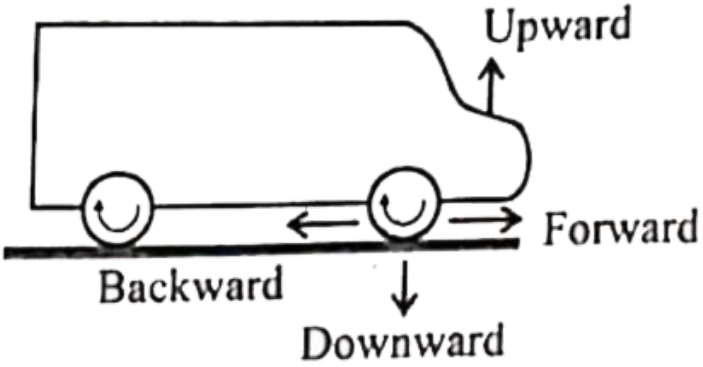
C. impulse friction

D. rolling friction

Answer: c

Watch Video Solution

134. Direction of frictional force between wheel of the car and road is



A. upward

B. forward

C. backward

D. downward

Answer: b

Watch Video Solution

135. Which of the following is the dimension of coefficient of friction

A. MLT^{-2}

B. $M^0L^0T^0$

C. M^2LT^{-2}

D. M^2LT

Answer: b

Watch Video Solution

136. If μ_s is coefficient of static friction and μ_k is coefficent of kinetic friction then

A. there is no relation between μ_s and μ_k

B. general,ly $\mu_s > \mu_k$

C. generally $\mu_s = \mu_k$

D. generally $\mu_s < m, u_k$

Answer: b

Watch Video Solution

137. For a car not to turn safely on a curved raod

A. speed is slow

B. distance between tyres is largwe

C. centre of gravity for car is low

D. low friction force

Answer: d

Watch Video Solution

138. A body of mass m slides down a rough plane of uinclination α if μ is the coefficent of friction then acceleratio of the body will be

A. $g \sin \alpha$

B. $\mu \cos \alpha$

C. $g(\sin \alpha - \mu \cos \alpha)$

D. $g(\cos \alpha - \mu \sin \alpha)$

Answer: c

Watch Video Solution

139. Which one of the following statements is a correct statement?

A. stick to each other

B. slide upon each other

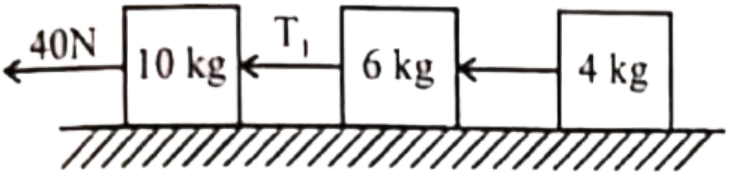
C. roll upon each other

D. none of these

Answer: b

Watch Video Solution

140. A 40N force pulls a system of three masses on a horizontal frictionless surface the value of tension T_1 is



A. 10 N

B. 20 N

C. 30 N

D. 40 N

Answer: b

Watch Video Solution

141. An object placed on an inclined plane starts sliding when the angle of incline becomes 30° the coefficent of statyic friction between the object and the plane is

A. $\frac{1}{\sqrt{3}}$

B. $\sqrt{3}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

Answer: a

Watch Video Solution

142. A boy presses a book against the front wall such that the book do not move the force of friction between the wall and the book is

A. towards right

B. towards left

C. downwards

D. upwards

Answer: d

Watch Video Solution

143. A cyclist travels with a speed of $36km^{-1}$ if the angle of inclinatio with vertical is 45°

while he goes around a circle then the radius of the circle is

A. 7m

B. 10 m

C. 5.5 m

D. 20 m

Answer: b

Watch Video Solution

144. Identify the correct statement

A. static friction depends on the area of contact

B. kinetic friction depends on the area of contact

C. coefficient of static friction does not depend on the surfaces in contacct

D. coefficient of kinetic functio is less than the coefficeint of static friction

Answer: d

Watch Video Solution

145. A particle revolves round a circular path the acceleration of the particle is inversely proportional to

A. radius

B. velocity alone

C. mass of particle

D. both b and c

Answer: a

Watch Video Solution

146. When milk is churned cream gets separated due to

A. centripetal force

B. centrifugal force

C. frictional force

D. gravitational force

Answer: b

Watch Video Solution

147. Statement 1 represent assertion And statement 2 represents reason which one of the following is correct

Statement 1 The driver in a car moving with a constant speed on a straight road is non inertial frame of reference

Statement 2 A frame of reference in which

newton 's laws of motion are applicable is a non inertial frame

A. statement 1 is ture and statement 2 is false

B. statement 1 is true and statement 2 is false

C. statement 1 is true and statemetn 2 is ture gives correct explanation for statement 1

D. statement 1 is true and statement 2 is true but it does not explain statement 1

Answer: b

148. A body is moving in a circular path with acceleration a if its velocity gets doubled find the ratio acceleration after and before the change

A. $1:4$

B. $\frac{1}{4}:1$

C. $2:1$

D. $4:1$

Answer: d

Watch Video Solution

149. Assertion : on a rainy day it is difficult to drive a bus at high speed

Reason : Due to wetting of the surface the

value of coefficient of friction is lowered Which one of the following statement is a correct statement

A. Assertion is true and reasoin is false

B. Assertion is true but reason does not explain assertion

C. Assertion is true and reason expalins assertin

D. Assertion is true reason is also true

Answer: d

Watch Video Solution

150. For the following situation which of the following is correct

When a car takes a turn on the road the centripetal force is provided by

A. weight of the car

B. gravitational force

C. the frictional force between the tyres and the road

D. all the above

Answer: c

Watch Video Solution

151. Assertion : Usage of ball bearing between two moving parts in a machine is a common practice

Reason : Ball bearing reduce vibrations and provide good stability

Which one of the following statement is a correct statement

A. assertion is true and reason is true and explains assertio

B. assertion is true and reason explain assertion

C. assertion is true and reson is flase

D. assertion is flase and reason is true

Answer: c

Watch Video Solution

152. Which one of the following statement is correct for the following situation

Assertion : Frictional forces are conservative forces

Reason : Potential energy is associated with frictional forces

A. assertion is true and reason is false

B. assertion is false and reason is true f

C. assertion is flase and reson is false

D. assertion is true and reson is true

Answer: c

Watch Video Solution

153. Which of the following is a correct statement when a car is moving as follows when a car is turning round a corner the person sitting inside the car

A. may fall dwon experiences a force

B. experiences a force

C. experiences an inward force

D. experiences outward force

Answer: d

Watch Video Solution

154. When a stone tied to the end of a string whireled in a circular path the centripetal force is provided by the

A. weight of the stone centrufugal force q

B. centrufugal force

C. tension in the string

D. weight of the string

Answer: c

Watch Video Solution

155. The condition for skidding is

A. $\tan\theta = \mu$

B. $\tan\theta < \mu$

C. $\tan\theta > \mu$

D. $\tan\theta = 0$

Answer: c

Watch Video Solution

156. A body is moving with a constant speed v in a circle of radius r. its angualr acceleration is :

A. vr

B. $\frac{v}{r}$

C. zero

D. $\frac{v}{r^3}$

Answer: c

Watch Video Solution

157. Which one of the following statement is correct for the following situation

Assertion : A man in a closed cabin which is

falling freely does not experience gravitational force

Reason: Inertial mass is equal to gravitational mass

A. assertio is true but reason is false

B. assertion is false but reason is true

C. assertion is true but reason is true and expalins assertion correctly

D. assertion is true reson is true but does not explain assertion correctly

Answer: d

Watch Video Solution

158. Select the odd man out from the following statement

A. centrifugal force is a pseudo force

B. centrifugal force is may be found in inertial frames

C. centrifugal force acts away from the centre of circulators path

D. centrufugal force acts only in rotating frames

Answer: b

 Watch Video Solution

159. When a particle is in uniform motion it does not have

A. radial velocity and radial acceleation

B. radial velocity and trasverse acceleration

C. transverse velocity and radial acceleration

D. transverse velcoity and transverse acceleartion

Answer: b

Watch Video Solution

160. Which of the following pairs is a correct pair A particle revolves round a circular path the acceleration of the particle is

A. along the circumference of the circle and $a = \frac{v^2}{m}$

B. along the tangent and v= ar

C. along the radius and $a = \frac{v^2}{r}$

D. zero and velocity is zero

Answer: c

Watch Video Solution

Other Important Questions Answers Ii Very Short Answer Question

1. State aristotelian of motion what is the flaw in this law ?

View Text Solution

2. State galileo 's law of inertia

Watch Video Solution

3. What do you mean by inertia of rest

Watch Video Solution

4. Force and motion acts in the same direction

given example

Watch Video Solution

5. Force and moton are in the opposite direction Given example

Watch Video Solution

6. Prove that second derivative of position vector is not zero then there must be a force on the body

Watch Video Solution

7. Show that if the force acting on the particle is zero its momentum remains unchaged

Watch Video Solution

8. Will the momentum remain conserved if some external force acts on the system

Watch Video Solution

9. Vechile stop on applying brakes does this phenomenon violate the principle of conservation of momentum

Watch Video Solution

10. Define impulse .

Watch Video Solution

11. Write the expression for impulse in terms of average force

Watch Video Solution

12. A bus weighingh 900 kg is at rest on the bus stand what is the linear momentum of the bus

Watch Video Solution

13. What is normal force

Watch Video Solution

14. Which is grater μ_s or μ_k

Watch Video Solution

15. What is the relation between angle of friction and angle of repose

Watch Video Solution

16. What is the angle between frictional force and isntantaneous velocity of a body moving over a rough surface

Watch Video Solution

17. What is the angle between frictional force and isntantaneous velocity of a body moving over a rough surface

Watch Video Solution

18. A body is in equilibrium on a rough inclined plane undr its own weight. If the angle of inclination of the inclined plane is α and the angle of friction is λ, then

Watch Video Solution

19. Does the force of friction depends on the area of contact

Watch Video Solution

20. It is easier to roll barrel than to pull it along the road why

Watch Video Solution

21. What is coefficient of static friction?

Watch Video Solution

22. What happens to coefficient of friction when weight of the body is doubled.

Watch Video Solution

23. Action and reaction forces do not balance each other . Why ?

Watch Video Solution

24. Can you cite a situation where no force acts on a body.

Watch Video Solution

25. What are position dependent forces

Watch Video Solution

26. Does friction occur in liquid and gases.

Watch Video Solution

27. Why is force of limiting friction F_c greater than force of kinetic friction F_k.

Watch Video Solution

28. What is the work done by centripetal force in moving a body through half cycle on the circular path of radius 35m

Watch Video Solution

29. Can a body in linear motion be in equilibrium.

Watch Video Solution

30. Ten one rupee coins are put on top of each other on table each coin has a mass 2g what is the magnitude of the force on the seventh coin due to all the coins at its top

Watch Video Solution

31. A body is acted upon by a number of external forces can it remain at rest

Watch Video Solution

32. State Aristotelian law of motion. What is flaw in this law ?

Watch Video Solution

33. State galileo 's law of inertia

Watch Video Solution

34. What do you mean by inertia of rest

Watch Video Solution

35. Force and motion acts in the same direction given example

Watch Video Solution

36. Force and moton are in the opposite direction Given example

Watch Video Solution

37. Prove that second derivative of position vector is not zero then there must be a force on the body

Watch Video Solution

38. Show that if the force acting on the particle is zero its momentum remains unchaged

Watch Video Solution

39. Will the momentum remain conserved if some external force acts on the system

Watch Video Solution

40. Vechile stop on applying brakes does this phenomenon violate the principle of conservation of momentum

Watch Video Solution

41. Define impulse .

Watch Video Solution

42. Write the expression for impulse in terms of average force

Watch Video Solution

43. A bus weighingh 900 kg is at rest on the bus stand what is the linear momentum of the

bus

Watch Video Solution

44. NORMAL FORCE

Watch Video Solution

45. Which is grater μ_s or μ_k

Watch Video Solution

46. What is the relation between angle of friction and angle of repose

Watch Video Solution

47. What is the angle between frictional force and isntantaneous velocity of a body moving over a rough surface

Watch Video Solution

48. What is the angle between frictional force and isntantaneous velocity of a body moving over a rough surface

Watch Video Solution

49. A body is just sliding dwon an inclined plane due to its own weight what is the relation between angle of inclination and angle of repose

View Text Solution

50. Does the force of friction depends on the area of contact

Watch Video Solution

51. It is easier to roll barrel than to pull it along the road why

Watch Video Solution

52. What is coefficient of static friction?

Watch Video Solution

53. What happens to coefficient of friction when weight of the body is doubled.

Watch Video Solution

54. Action and reaction forces do not balance each other . Why ?

Watch Video Solution

55. Can you cite a situation where no force acts on a body.

Watch Video Solution

56. What are position dependent forces

Watch Video Solution

57. Does friction occur in liquid and gases.

Watch Video Solution

58. Why is force of limiting friction F_c greater than force of kinetic friction F_k.

Watch Video Solution

59. What is the work done by centripetal force in moving a body through half cycle on the

circular path of radius 35m

Watch Video Solution

60. Can a body in linear motion be in equilibrium.

Watch Video Solution

61. Ten one rupee coins are put on top of each other on table each coin has a mass 2g what is

the magnitude of the force on the seventh coin due to all the coins at its top

Watch Video Solution

62. A body is acted upon by a number of external forces can it remain at rest

Watch Video Solution

Other Important Questions Answers Iii Short Answer Question

1. What do you mean by inertia of motion? Give one example

Watch Video Solution

2. What do you mean by inertia of direction? Give one example.

Watch Video Solution

3. What is non inertial frame of reference? Explain with example.

Watch Video Solution

4. With an example explaion a situatin where force and motion are not in the same direction

Watch Video Solution

5. Explain the motion of a raindrop from a cloud

Watch Video Solution

6. When a cricket player catches the ball he pulls his hand gradually in the direction of the ball 's motion given reason

Watch Video Solution

7. Explain the use of air bags in cars during accidents.

Watch Video Solution

8. An athlete runs a certain distance before taking a long jump . Why ?

Watch Video Solution

9. Automobiles are provided with shock absorbers why

Watch Video Solution

10. Jumping on a cemented floor receives more injuries than on the sand given reason

Watch Video Solution

11. Explain the term maximal static friction

Watch Video Solution

12. Given reason if he object is pressed hard on the surface where it is placed as result it is more difficult to move the object

Watch Video Solution

13. What is the angle of friction between two surfaces in contact if the coefficient of friction is $\frac{1}{\sqrt{3}}$

Watch Video Solution

14. Define angle of friction

Watch Video Solution

15. Given reasons for $f_s = \mu_s N$

View Text Solution

16. What is the need of banking a circular raod

Watch Video Solution

17. How does the use of ball bearing reduces friction

Watch Video Solution

18. When a bicycle moves in the forward direction what is the direction of the frictional force in the rear and front wheels

Watch Video Solution

19. A force can change the velocity of a particle in three different ways explain with example

Watch Video Solution

20. Derive the expression for centripetal acceleration.

Watch Video Solution

21. Explain centrifugal force due to rotation of the earth

Watch Video Solution

22. What do you mean by inertia of motion? Give one example

Watch Video Solution

23. What do you mean by inertia of direction? Give one example.

Watch Video Solution

24. What is non inertial frame of reference? Explain with example.

Watch Video Solution

25. With an example explaion a situatin where force and motion are not in the same direction

Watch Video Solution

26. Explain the motion of a raindrop from a cloud

Watch Video Solution

27. When a cricket player catches the ball he pulls his hand gradually in the direction of the ball 's motion given reason

Watch Video Solution

28. Explain the use of air bags in cars during accidents.

Watch Video Solution

29. An athlete runs a certain distance before taking a long jump . Why ?

Watch Video Solution

30. Automobiles are provided with shock absorbers why

Watch Video Solution

31. Jumping on a cemented floor receives more injuries than on the sand given reason

Watch Video Solution

32. Explain the term maximal static friction

Watch Video Solution

33. Given reason if he object is pressed hard on the surface where it is placed as result it is

more difficult to move the object

Watch Video Solution

34. What is the angle of friction between two surfaces in contact if the coefficient of friction is $\frac{1}{\sqrt{3}}$

Watch Video Solution

35. Define angle of friction

Watch Video Solution

36. Given reasons for $f_s = \mu_s N$

View Text Solution

37. What is the need of banking a circular raod

Watch Video Solution

38. How does the use of ball bearing reduces friction

Watch Video Solution

39. When a bicycle moves in the forward direction what is the direction of the frictional force in the rear and front wheels

Watch Video Solution

40. A force can change the velocity of a particle in three different ways explain with example

Watch Video Solution

41. Derive the expression for centripetal acceleration.

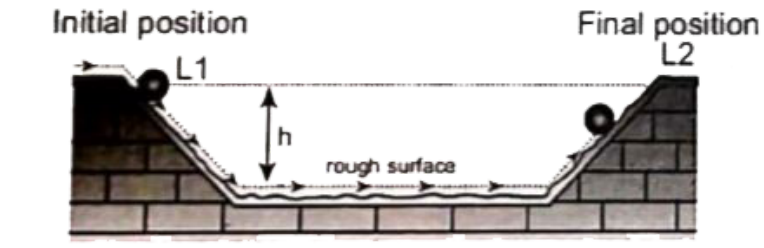
Watch Video Solution

42. Explain centrifugal force due to rotation of the earth

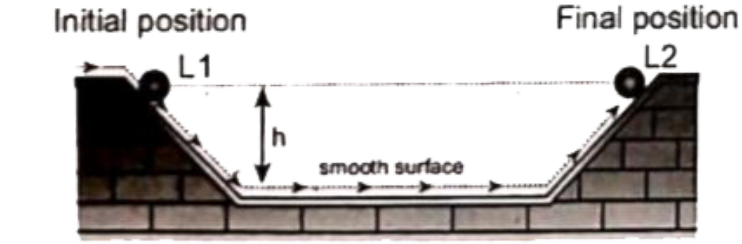
Watch Video Solution

Other Important Questions Answers Iv Long Answer Question

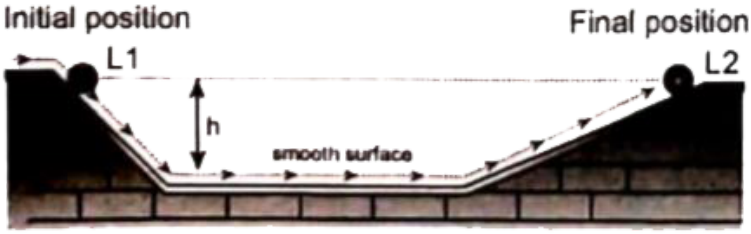
1. Describe galileo experiments concerning motion of object on inclined planes



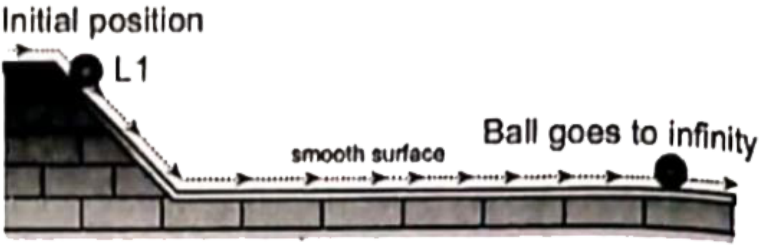
(a)



(b)



(c)



galileo 's experiment with the second plane (a) at same inclination angle as the first (b) with

increased smoothness (c) with reduced angle of inclination (d) with zero angle of inclination

Watch Video Solution

2. Explain with example how earth can be treated as both inertial and non inertial frame of reference

View Text Solution

3. Write a note on aristotle vs newton's approach on sliding object

Appraoch of aristotle on sliding object

Watch Video Solution

4. Express newton second law of motion in component form given its significance

View Text Solution

5. For the same force heavier mass experience lesser acceleration explain

Watch Video Solution

6. Using newton 's laws calculate the tension acting on the mango haging from a tree

Watch Video Solution

7. Briefly explain how is a horse able to pull a cart

Watch Video Solution

8. Explain the meaning of law of conservation of linear momentum

Watch Video Solution

9. Prove impulse momentum equation

Watch Video Solution

10. Show how impulse force can be measured graphically

Watch Video Solution

11. What happens to the object at rest if (i) $f_s = 0 (ii) f_s = f_{\text{ext}} (iii) f_s = \max$

Watch Video Solution

12. Draw and explain the variations of force of friction vs applied force graphically

Watch Video Solution

13. List and explain any two application of angle of repose

View Text Solution

14. With an activity prove that coefficent of static friction vaies from object to object

View Text Solution

15. Derive an expression for the acceleartion of the body sliding down a frictionless surface

View Text Solution

16. Tow masses m_1 and $m_2(m_1 > m_2)$ are in contact with each other on a smooth horizontal surface calculate the magnitude of contact force between them

View Text Solution

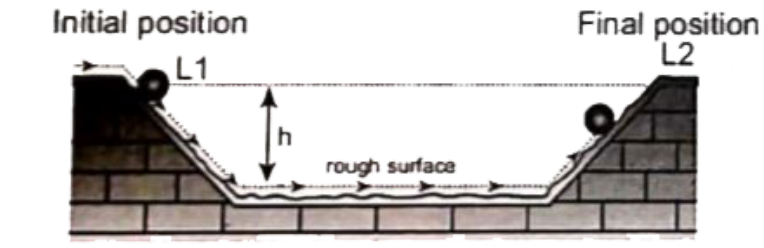
17. Briefly explain how is a vehicle able to go round a leveled curved track determine the maximum speed with which the vehicle can negotiate this curved track safely

View Text Solution

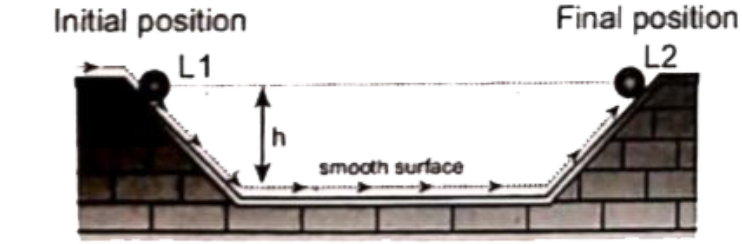
18. Determine the angle of banking so as to minimize the wear and tear of the tyres of car negotiating a banked curve

Watch Video Solution

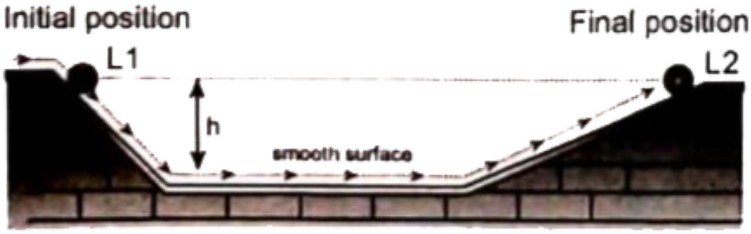
19. Describe galileo experiments concerning motion of object on inclined planes



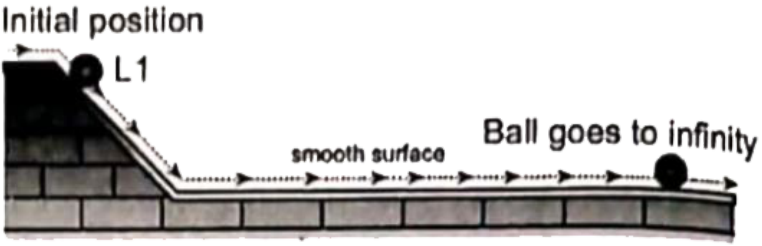
(a)



(b)



(c)



galileo 's experiment with the second plane (a) at same inclination angle as the first (b) with

increased smoothness (c) with reduced angle of inclination (d) with zero angle of inclination

View Text Solution

20. Explain with example how earth can be treated as both inertial and non inertial frame of reference

View Text Solution

21. Write a note on aristotle vs newton's approach on sliding object

Appraoch of aristotle on sliding object

Watch Video Solution

22. Express Newton's second law of motion in component form. Give its significance.

Watch Video Solution

23. For the same force heavier mass experience lesser acceleration explain

Watch Video Solution

24. Using newton 's laws calculate the tension acting on the mango haging from a tree

Watch Video Solution

25. Briefly explain how is a horse able to pull a cart

Watch Video Solution

26. Explain the meaning of law of conservation of linear momentum

Watch Video Solution

27. Prove impulse momentum equation

Watch Video Solution

28. Show how impulse force can be measured graphically

Watch Video Solution

29. What happens to the object at rest if (i) $f_s = 0 (ii) f_s = f_{\text{ext}} (iii) f_s = \max$

Watch Video Solution

30. Draw and explain the variations of force of friction vs applied force graphically

Watch Video Solution

31. List and explain any two application of angle of repose

View Text Solution

32. With an activity prove that coefficent of static friction vaies from object to object

View Text Solution

33. Derive an expression for the acceleartion of the body sliding down a frictionless surface

Watch Video Solution

34. Two blocks of masses m_1 and $m_2(m_1 > m_2)$ in contact with each other on frictionless, horizontal surface. If a horizontal force F is given onm_1 set into motion with acceleration a, then reaction force on mass m_1 by m_2 is

Watch Video Solution

35. Briefly explain how is a vehicle able to go round a leveled curved track determine the

maximum speed with which the vehicle can negotiate this curved track safely

Watch Video Solution

36. Determine the angle of banking so as to minimize the wear and tear of the tyres of car negotiating a banked curve

Watch Video Solution

Other Important Questions Answers V Conceptual Question

1. Why is it necessary to bend kness while jumping from greater height

Watch Video Solution

2. Automobile tyres are generally provied with irregualr projection over their surfaces why

Watch Video Solution

3. Why are wheels of automobile made circular

Watch Video Solution

4. Proper inflation of typres of vehicles saves fuel given reason

Watch Video Solution

5. In a tug of war the team that pushes harder against the ground wins why

Watch Video Solution

6. A man is at rest in the middle of a pond on perfectly frictonless ice how can he get himself to the shore

Watch Video Solution

7. Why horse has to pull a cart harder during the first few steps of his motion

Watch Video Solution

8. Why do the blades of an electric fan continue to ratate for some time after the current is switched off

Watch Video Solution

9. Why is it necessary to bend kness while jumping from greater height

Watch Video Solution

10. Automobile tyres are generally provied with irregualr projection over their surfaces why

Watch Video Solution

11. Why are wheels of automobile made circular

Watch Video Solution

12. Proper inflation of typres of vehicles saves fuel given reason

Watch Video Solution

13. In a tug of war the team that pushes harder against the ground wins why

Watch Video Solution

14. A man is at rest in the middle of a pond on perfectly frictonless ice how can he get himself to the shore

Watch Video Solution

15. Why horse has to pull a cart harder during the first few steps of his motion

Watch Video Solution

16. Why do the blades of an electric fan continue to ratate for some time after the current is switched off

Watch Video Solution

Other Important Questions Answers Vi Numerical Problems

1. A scooterist moving with a speed of $36mkmh^{-1}$ sees a child standing in the middle of the raod he applies the brakes and

brings the scooter to rest in 5s just in time to saved child calculate the average retarding force on the vehicle if mass of the vehicle and drive is 300 kg

Watch Video Solution

2. A bus starts from rest accelerating uniformly with $4ms^{-1}$ at t =10s a stone is dropped out of a window of the bus 2m high what are the (i) magnitude of velocity and (ii)

accelearatio of the stone at 10.2 s take g=10 ms^{-2}

Watch Video Solution

3. Force of $5\sqrt{2}$ and $6\sqrt{2}$ N are acting on a body of mass 1000 kg at an angle 60° to each other calculate (i) acceeration velocity and (ii) distcne coverd by other body after 10s

Watch Video Solution

4. A ball of mass 150g moving with a velocity of 15 ms^{-1} brought to rest by a player in 0.05 s calculate the impulse and the average forfe exerted by the playeer

Watch Video Solution

5. A machine gun fires a bullet of mass 40 g with a speed of 1200 ms^{-1} the person holding the gun can exert a maximum force

144 N on it what is the number of bullets that can be fired from the gun per second

Watch Video Solution

6. A ball moving with a momentum of $5kgms^{-1}$ strikes against a wall at an angle of 45° and is reflected at the same angle calculate the angle in momentum

Watch Video Solution

7. A force $\vec{F} = \left(6\vec{i} - 8\vec{j} + 10k\right)N$ produces acceleartion of $1\frac{m}{s^2}$ in a body calculate the mass of the body

Watch Video Solution

8. A block of mass 5kg resting on a frictionless plane it is stuck by a jet releasing water at a rate of 3 kg /s at speed of 4 m/s calculate the initial acceleartion of the block

Watch Video Solution

9. The initial speed of a body of mass 2.0 kg is $5.0ms^{-1}$ a force fro 4s in the direction of motion of the body the force time graph is shown in the diagram calculate the impulse of the force and the final speed of the body

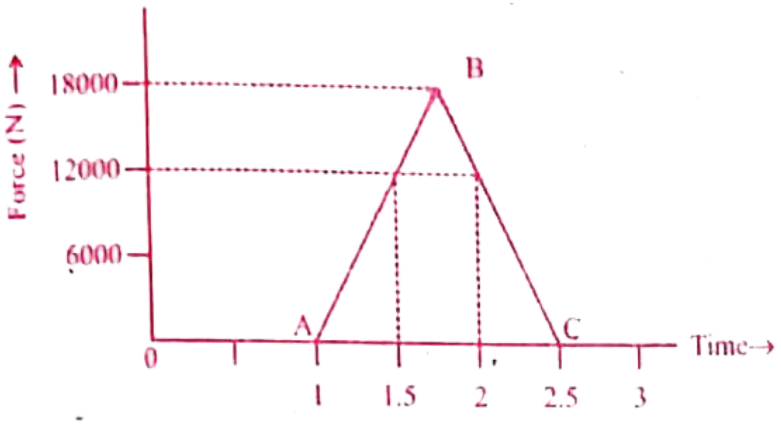
Watch Video Solution

10. A ball of mass 0.20 kg hits a wall at an angle of 45° with a velocity of 25 m/s if the ball rebound at 90° to the direction of

incidence calculate the change in momentum of the ball.

Watch Video Solution

11. The diagram shows an estimeated force time graph for a baseball struck by a bat



Watch Video Solution

12. A machine gun can fire 50g bullets with a velocity of $150ms^{-1}$ A 80 kg tiger springs at him with a velocity of $200ms^{-1}$ how many bullets must be fired in to the tiger in order to stop him in track

Watch Video Solution

13. A bullet of mass 100 g is fired by a gun of 10 kg with a speed of 2000 m/s find recoil velocity of gun

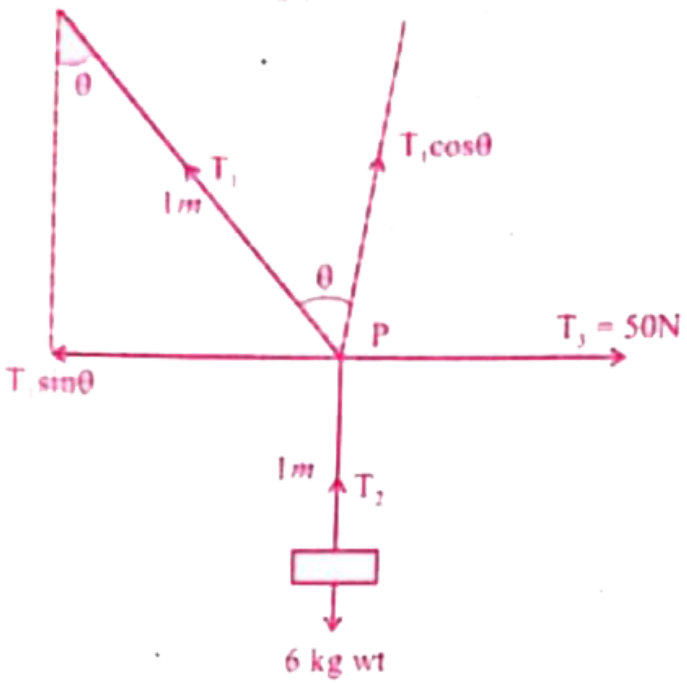
Watch Video Solution

14. A neutron having a mass 1.67×10^{-27} kg and moving at $10^{8} ms^{-1}$ collides with a deuteron at rest and sticks to it if the mass of deuteron is 3.34×10^{-27} kg find the speed of the combination

Watch Video Solution

15. A mass of 6kg is suspended by a rope of length 2m from a celling a force of 50N in the horizontal direction is applied at the midpoint of the rope as shown in the figure what is the angle the rope makes with the vertical is equalibrium take $g = 10ms^{-2}$ neglect mass

of the rope



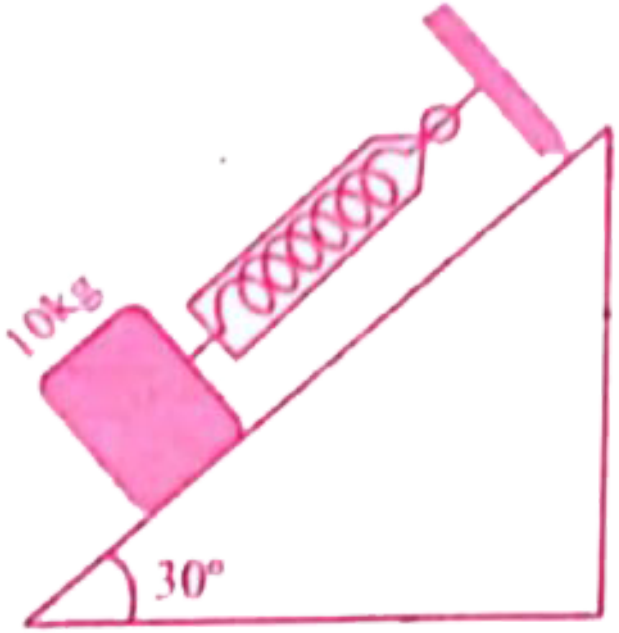
Watch Video Solution

16. The system is in equilibrium if the spring balance is calibrated in newton what does it

record in each case

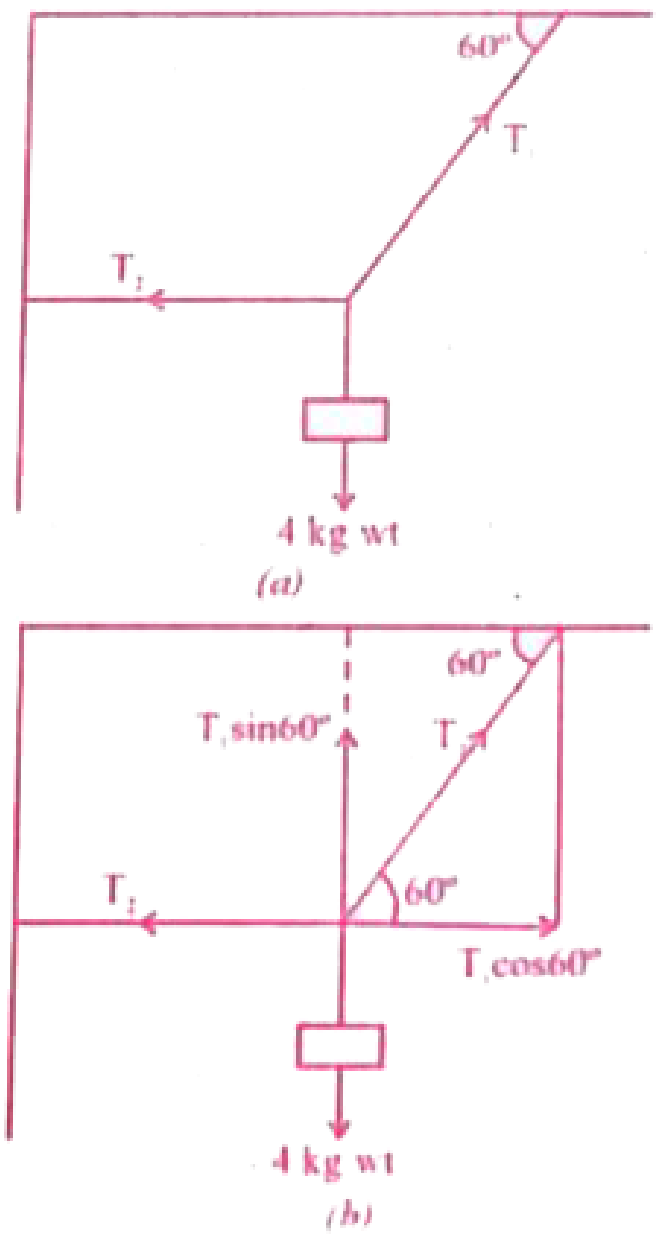
(a)

(b)



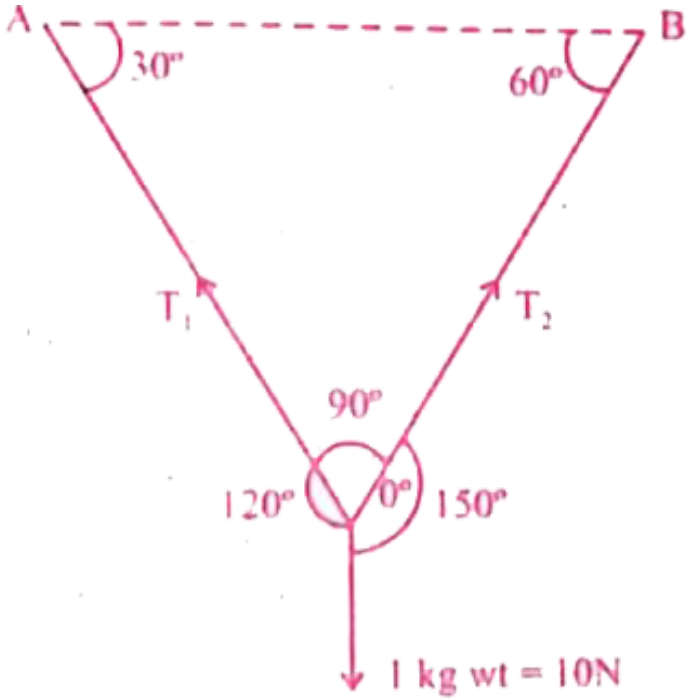
Watch Video Solution

17. Determine the tension T_1 and T_2 in the strings



Watch Video Solution

18. A ball of mass 1 kg hangs in equlibrium from two stings OA and OB in the diagram calcualte the tensions in stings OA and OB take $g = 10ms^{-2}$



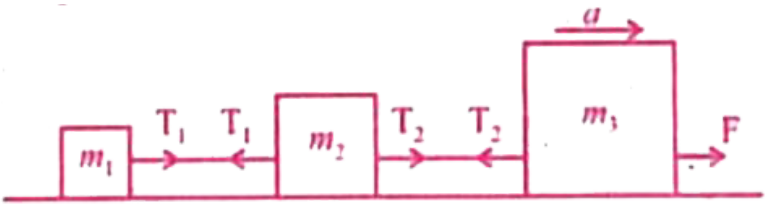
Watch Video Solution

19. A hunter has a machine gun that can fire 50 g bullets with a velocity of $150ms^{-1}$. A 60 kg tiger springs at him with a velocity $10ms^{-1}$ how many bullets must the hunter fire in to the tiger in order to stop him in his track

Watch Video Solution

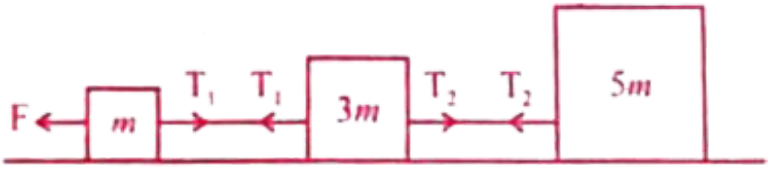
20. As in the diagram three blocks connected together lie on a horizontal frictionless table and pulled to the right with a force F=50 N if

$m_1 = 5kgm_2 = 10$ kg and $m_3 = 15kg$ find the tensions T_1 and T_2



Watch Video Solution

21. As shown in the diagram three masssesm 3m and 5m connected together lie on a frictionless horizontal surface and pulled to the left by a force f the tension T_1 in the first sting is 24 N find



(i) acceleartion of the system

(ii) tension in the second string and

(iii) force f

Watch Video Solution

22. A force of 49N is just sufficient to pull a block of wookd weighing 10 kg on a rough horizontal surface calculate the coefficient of friction and angle of friction

Watch Video Solution

23. A mass of 4kg rests on a horizontal plane the plane is gradually inclined unitl at an angle =15 with the horizontal the mass just begins to slide what is the coefficient of static friction bwtween the block and the surface

Watch Video Solution

24. Determine the maximum acceleration of the train in which a box lying on its floor will

remain stationary given that the coefficeient of static friction between the box and the train 's floor is 0.15 take $g = 10ms^{-2}$

Watch Video Solution

25. A block of mass 2 kg rests on a plane inclined at an angle of 30° with the horizontal the coefficient of friction between the block and the surface is 0.7 what will be the frictional force acting on the block

Watch Video Solution

26. A sting breaks under a load of 4.8 kg A mass of 0.5 kg is attached to one end to the string 2m along and is ratated in a horizontal circle caculate the greatest number of revolutions that the mass can make without breaking the string

Watch Video Solution

27. A stone of mass 1kg is whirled in a circular path of radius 1m find out the tension in the

string if the linear velocity is 10 m/s

Watch Video Solution

28. In a circus the diameter of the globe of depth is 20 m calculate the minimum height must a cyclist start in order to go round the globe successfully

Watch Video Solution

29. A bend in a level road has radius of 100 mtrs find the maximum speed which a car turning this bend may have without skidding if the coefficent of friction between the typres and raod is 0.8 , will be

Watch Video Solution

30. A car is travelling at 30 km/ h in a circle of radius 60 m what is the minimum value of μ_s for the car to make the turn without skidding

Watch Video Solution

31. A car of mass 1500 kg is moving with a speed of $12.5ms^{-1}$ on a circular path of radius 20 m on a level raod what should be the frictional force between the car and the raod so that the car does not slip what should be the value of the coefficent of friction to attain this force

Watch Video Solution

32. A scooterist moving with a speed of $36mkmh^{-1}$ sees a child standing in the middle of the raod he applies the brakes and brings the scooter to rest in 5s just in time to saved child calculate the average retarding force on the vehicle if mass of the vehicle and drive is 300 kg

Watch Video Solution

33. A bus starts from rest accelerating uniformly with $4ms^{-1}$ at t =10s a stone is dropped out of a window of the bus 2m high what are the (i) magnitude of velocity and (ii) accelearatio of the stone at 10.2 s take g=10 ms^{-2}

Watch Video Solution

34. Force of $5\sqrt{2}$ and $6\sqrt{2}$ N are acting on a body of mass 1000 kg at an angle 60° to each

other calculate (i) acceeration velocity and (ii) distcne coverd by other body after 10s

Watch Video Solution

35. A ball of mass 150g moving with a velocity of 15 ms^{-1} brought to rest by a player in 0.05 s calculate the impulse and the average forfe exerted by the playeer

Watch Video Solution

36. A machine gun fires a bullet of mass 40 g with a speed of 1200 ms^{-1} the person holding the gun can exert a maximum force 144 N on it what is the number of bullets that can be fired from the gun per second

Watch Video Solution

37. A ball moving with a momentum of $5kgms^{-1}$ strikes against a wall at an angle of

45° and is reflected at the same angle calculate the change in momentum

Watch Video Solution

38. A force $\vec{F} = \left(6\vec{i} - 8\vec{j} + 10k\right)N$ produces acceleartion of $1\frac{m}{s^2}$ in a body calculate the mass of the body

Watch Video Solution

39. A block of mass 5kg resting on a frictionless plane it is stuck by a jet releasing water at a rate of 3 kg /s at speed of 4 m/s calculate the initial acceleartion of the block

Watch Video Solution

40. The initial speed of a body of mass 2.0 kg is $5.0ms^{-1}$ a force fro 4s in the direction of motion of the body the force time graph is

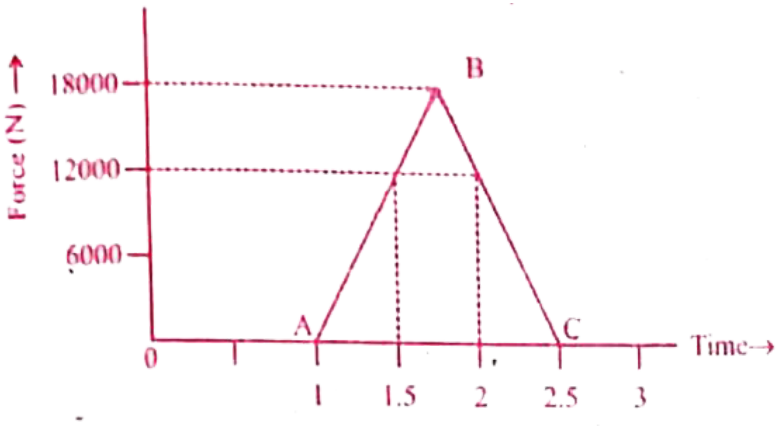
shown in the diagram calculate the impulse of the force and the final speed of the body

Watch Video Solution

41. A ball of mass 0.20 kg hits a wall at an angle of 45° with a velocity of 25 m/s if the ball rebound at 90° to the direction of incidence calculate the change in momentum of the ball.

Watch Video Solution

42. The diagram shows an estimeated force time graph for a baseball struck by a bat



Watch Video Solution

43. A machine gun can fire 50g bullets with a velocity of $200ms^{-1}$ A 80 kg tiger springs at him with a velocity of $200ms^{-1}$ how many

bullets must be fired in to the tiger in order to stop him in track

Watch Video Solution

44. A bullet of mass 100 g is fired by a gun of 10 kg with a speed of 2000 m/s find recoil velocity of gun

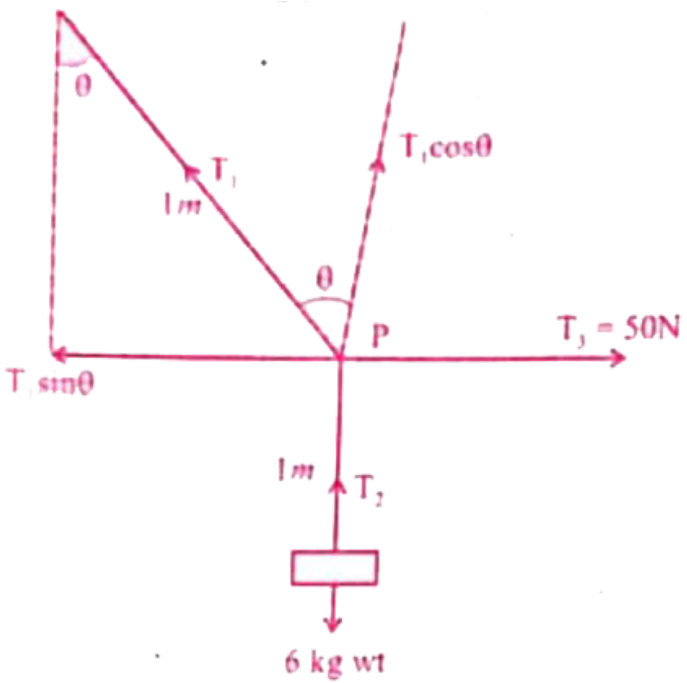
Watch Video Solution

45. A neutron having a mass 1.67×10^{-27} kg and moving at $10^{8} ms^{-1}$ collides with a deuteron at rest and sticks to it if the mass of deuteron is 3.34×10^{-27} kg find the speed of the combination

Watch Video Solution

46. A mass of 6kg is suspended by a rope of length 2m from a celling a force of 50N in the horizontal direction is applied at the midpoint

of the rope as shown in the figure what is the angle the rope makes with the vertical is equalibrium take $g = 10ms^{-2}$ neglect mass of the rope

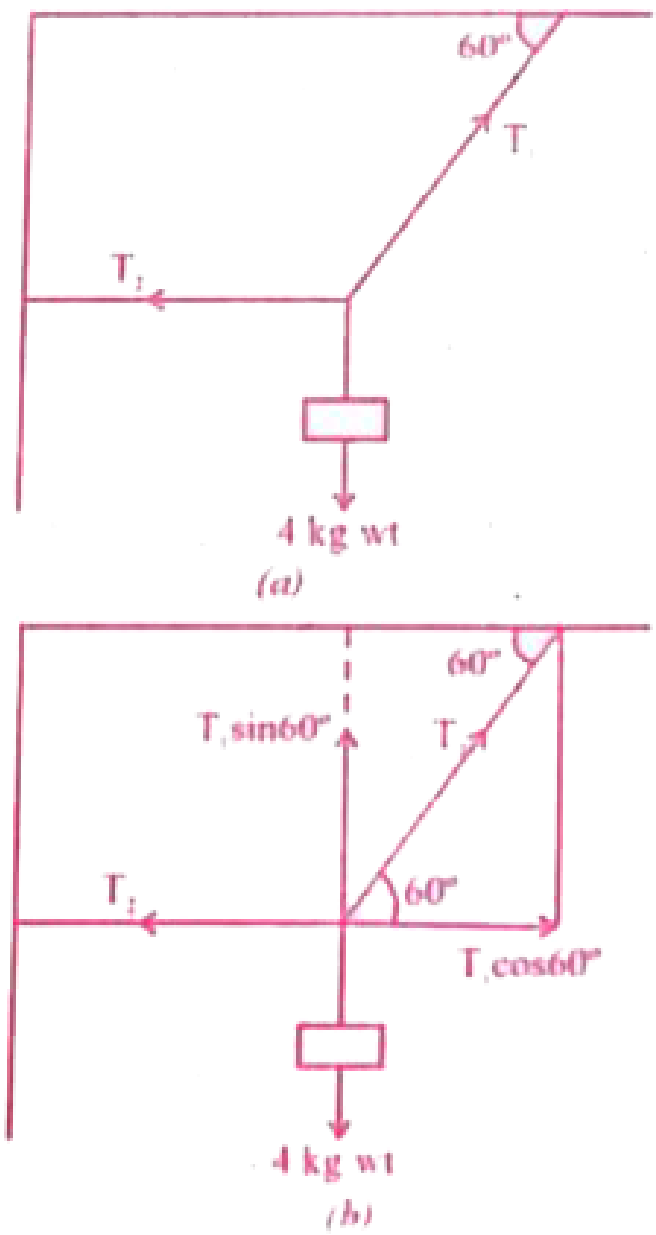


Watch Video Solution

47. Match the following :

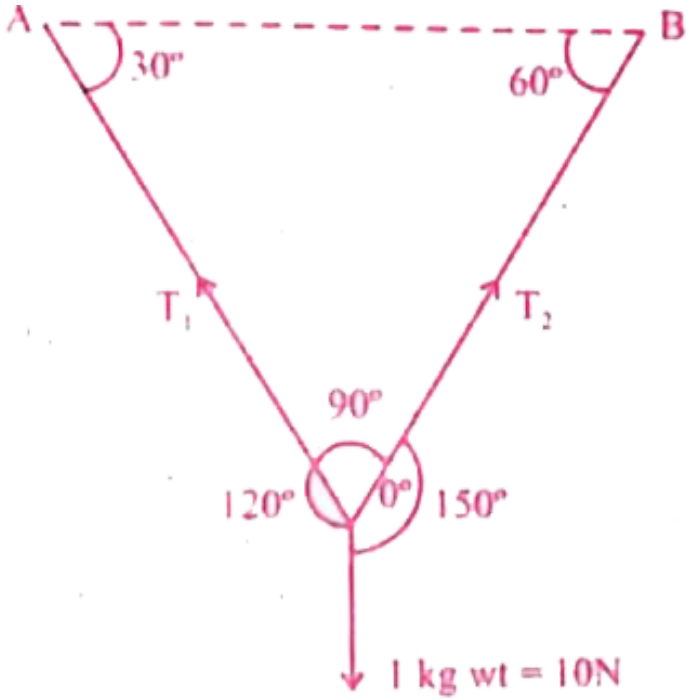
Watch Video Solution

48. Determine the tension T_1 and T_2 in the strings



Watch Video Solution

49. A ball of mass 1 kg hangs in equlibrium from two stings OA and OB in the diagram calcualte the tensions in stings OA and OB take $g = 10ms^{-2}$



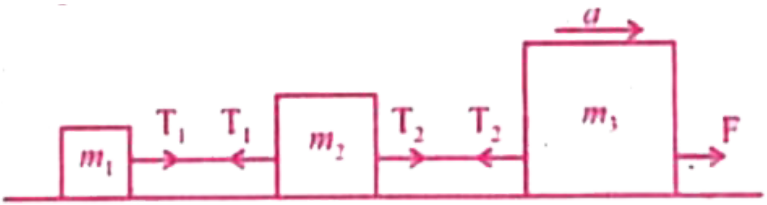
Watch Video Solution

50. A hunter has a machine gun that can fire 50 g bullets with a velocity of $150ms^{-1}$. A 60 kg tiger springs at him with a velocity $10ms^{-1}$ how many bullets must the hunter fire in to the tiger in order to stop him in his track

Watch Video Solution

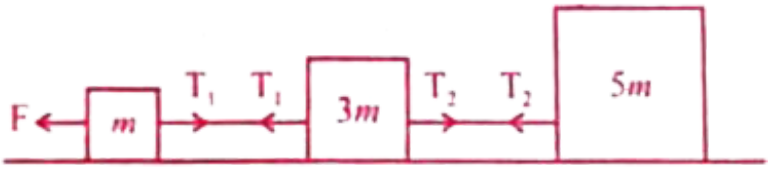
51. As in the diagram three blocks connected together lie on a horizontal frictionless table and pulled to the right with a force F=50 N if

$m_1 = 5kgm_2 = 10$ kg and $m_3 = 15kg$ find the tensions T_1 and T_2



Watch Video Solution

52. As shown in the diagram three masssesm 3m and 5m connected together lie on a frictionless horizontal surface and pulled to the left by a force f the tension T_1 in the first sting is 24 N find



(i) acceleartion of the system

(ii) tension in the second string and

(iii) force f

Watch Video Solution

53. A force of 49N is just sufficient to pull a block of wookd weighing 10 kg on a rough horizontal surface calculate the coefficient of friction and angle of friction

Watch Video Solution

54. A mass of 4kg rests on a horizontal plane the plane is gradually inclined unitl at an angle =15 with the horizontal the mass just begins to slide what is the coefficient of static friction bwtween the block and the surface

Watch Video Solution

55. Determine the maximum acceleration of the train in which a box lying on its floor will

remain stationary given that the coefficeient of static friction between the box and the train 's floor is 0.15 take $g = 10ms^{-2}$

Watch Video Solution

56. A block of mass 2 kg rests on a plane inclined at an angle of 30° with the horizontal the coefficient of friction between the block and the surface is 0.7 what will be the frictional force acting on the block

Watch Video Solution

57. A sting breaks under a load of 4.8 kg A mass of 0.5 kg is attached to one end to the string 2m along and is ratated in a horizontal circle caculate the greatest number of revolutions that the mass can make without breaking the string

Watch Video Solution

58. A stone of mass 1kg is whirled in a circular path of radius 1m find out the tension in the

string if the linear velocity is 10 m/s

Watch Video Solution

59. In a circus the diameter of the globe of depth is 20 m calculate the minimum height must a cyclist start in order to go round the globe successfully

Watch Video Solution

60. A bend in a level road has radius of 100 mtrs find the maximum speed which a car turning this bend may have without skidding if the coefficent of friction between the typres and raod is 0.8 , will be

Watch Video Solution

61. A car is travelling at 30 km/ h in a circle of radius 60 m what is the minimum value of μ_s for the car to make the turn without skidding

Watch Video Solution

62. A car of mass 1500 kg is moving with a speed of $12.5ms^{-1}$ on a circular path of radius 20 m on a level raod what should be the frictional force between the car and the raod so that the car does not slip what should be the value of the coefficent of friction to attain this force

Watch Video Solution