

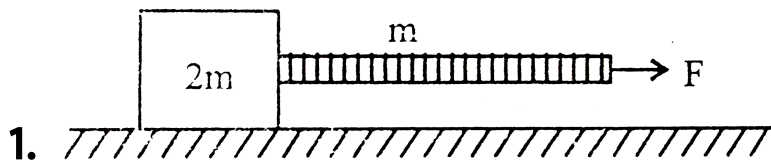


PHYSICS

BOOKS - NDA PREVIOUS YEARS

Mechanics

Physics



A block of mass $2 m$ is pulled along a

horizontal frictionless surface by a rope of mass m as shown in the figure given above.

What force is exerted by the rope on the block ?

A. $\frac{F}{3}$

B. $\frac{F}{2}$

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

D. F

Answer: D



Watch Video Solution

2. How does the weight of a body vary while moving from the earth to the moon ?

A. It gradually decreases till it reaches the moon surface

B. It gradually increases till it reaches the moon surface.

C. First it gradually decreases to zero value and then increases till it reaches the moon surface

D. First it gradually increases and then decreases till it reaches the moon surface.

Answer: C



Watch Video Solution

3. Consider the following statements:

1. The gravitational force exerted by the sun on the moon is greater than the gravitational force exerted by the earth on the moon.

2. A heavy body falls at a faster rate than a light body in vacuum.

Which of the following statements given above is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A



Watch Video Solution

4. A stone is thrown vertically upwards with an initial velocity u from the top of a tower of height $\frac{12u^2}{g}$. With what velocity does the stone reach the ground?

A. u

B. $4u$

C. $5u$

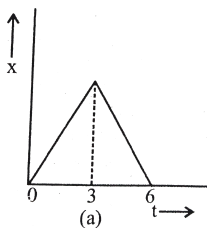
D. $2\sqrt{6}u$

Answer: C

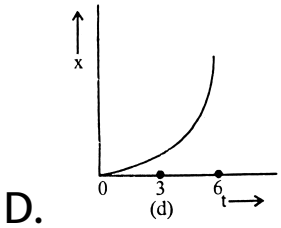
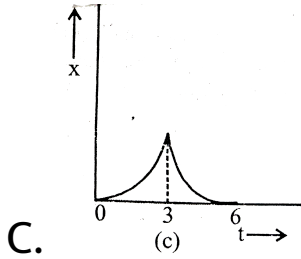
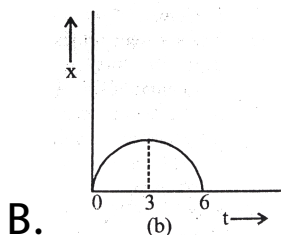


Watch Video Solution

5. A particle starts from rest, accelerates uniformly for 3 seconds and then decelerates uniformly for 3 seconds and comes to rest. Which one of the following displacement (x)-time (t) graphs represents the motion of the particle?



A.

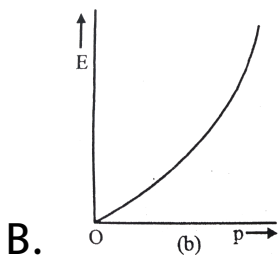
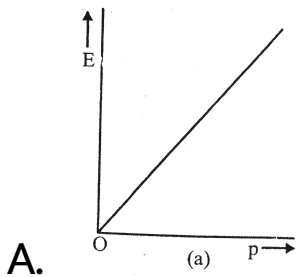


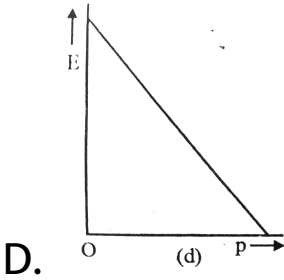
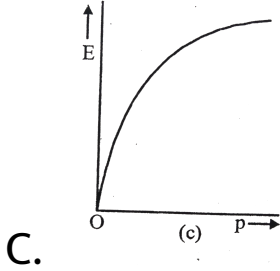
Answer: C



Watch Video Solution

6. Which one of the following correctly represents the variation between linear momentum (P) and kinetic energy (E) of a body?





Answer: B

 [Watch Video Solution](#)

7. A mass m_1 is moving on a plane surface along a straight path under the action of a

force F . Another mass m_2 is added on to m_1 and the acceleration drops to $1/5$ of the earlier value of the acceleration. Assuming that F remains constant, what is the ratio $m_1 : m_2$?

A. $1/6$

B. $1/5$

C. $1/4$

D. $4/5$

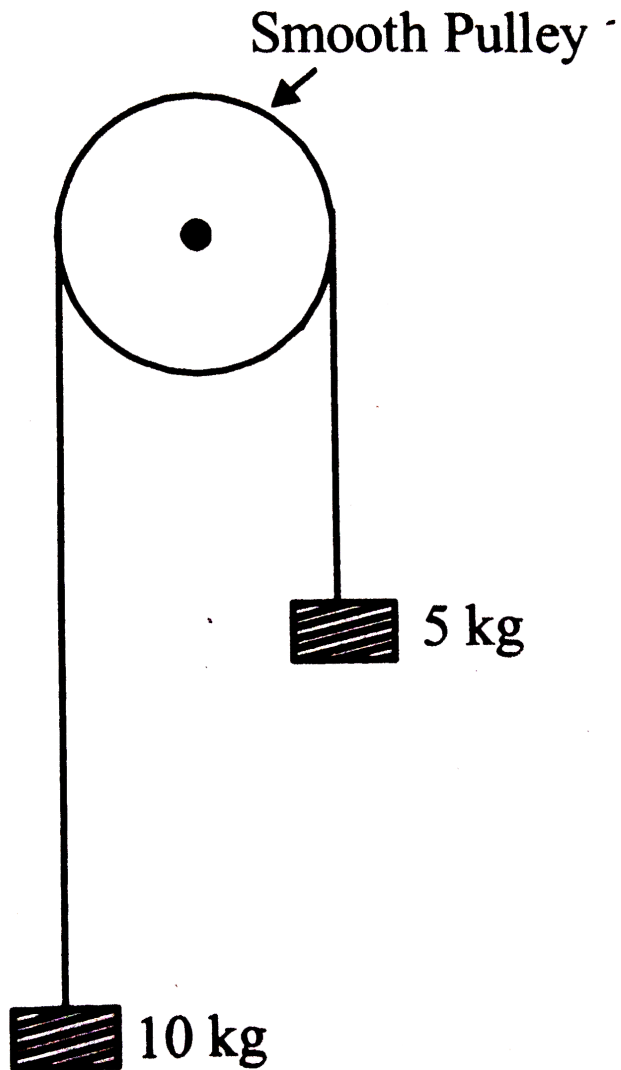
Answer: C



Watch Video Solution

8. In the system shown, the masses are released from rest. What shall be the

acceleration of the moving masses?



A. g

B. $2g/3$

C. $g/3$

D. $g/2$

Answer: C



Watch Video Solution

9. A motorcycle, a car and a bus all have the same kinetic energy. If equal braking forces are applied to them, they come to a halt after travelling x , y and z units of distance

respectively. Which one of the following is correct ?

A. $x < y < z$

B. $x > y > z$

C. $x = y = z$

D. Relationship between x , y and z cannot be determined on the basis of given data

Answer: C



Watch Video Solution

10. Two teams are pulling a rope with equal and opposite forces each of 5 kN in a tug of war so that a condition of equilibrium exists. What will be the tensile force in the rope?

- A. Zero
- B. 2.5 kN
- C. 5 kN
- D. 10 kN

Answer: C



Watch Video Solution

11. Consider the following statements. Work is not done, when:

1. a man is walking on a horizontal road.
2. a man is climbing up a hill.
3. a man with a load on his head is walking on a horizontal road.
4. moon is revolving round the earth. Which of the statements given above are correct?

A. 1 and 3 only

B. 1 and 4 only

C. 2, 3 and 4

D. 1, 3 and 4

Answer: D



Watch Video Solution

12. Consider the following statements: A body weighs less at the equator than at the poles because:

1. earth rotates about its axis.

2. the ice cap at the poles increases gravitational pull.

equatorial diameter is greater than the polar diameter.

of some unknown facts. Which of the statements given above is/are incorrect?

A. 1 and 2

B. 3 only

C. 1 and 3

D. 4 only

Answer: B



Watch Video Solution

13. The value of which one of the following quantities remains same in all systems of units?

A. Acceleration due to gravity

B. Specific gravity

C. Pressure

D. Density

Answer: B



Watch Video Solution

14. What would be the power of an engine which supplies 18 kJ of energy per minute?

A. 200 W

B. 250 W

C. 300 W

D. 1080 W

Answer: C



15. If the linear momentum of a body is increased by 5%, by what percentage shall the kinetic energy increase (approx.)?

- A. 0.1
- B. 0.2
- C. 0.25
- D. 0.5

Answer: A



Watch Video Solution

16. A bus moving at a speed of 24m/s begins to slow at a rate of 3 m/s^2 each second. How far does it go before stopping?

A. 96 m

B. 72 m

C. 60 m

D. 48 m

Answer: A



Watch Video Solution

17. A bullet travelling horizontally hits a block kept at rest on a horizontal surface and gets embedded into it, the two together then move with a uniform velocity. Which one of the following conservation laws holds?

- A. Conservation of angular momentum
- B. Conservation of kinetic energy
- C. Conservation of linear momentum

D. Conservation of velocity

Answer: C



Watch Video Solution

18. A cord is used to lower vertically a block of mass M through a distance d at a constant downward acceleration $\frac{g}{4}$. Consider the following statements:

1. The block is freely falling under gravity.

2. The cord is doing work on the block.

3. The amount of work done is $\frac{(3Mgd)}{4}$

A. 1 and 2 only

B. 1 and 3 only

C. 2 and 3 only

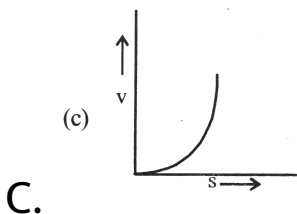
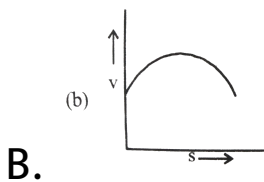
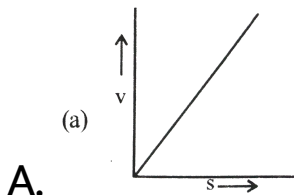
D. 1, 2 and 3

Answer: C

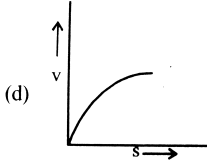


Watch Video Solution

19. A body starting from the the rest moves along a straight line with constant acceleration. Which one of the following graphs represents the variation of speed(v) and distance(s)?



D.



Answer: C



Watch Video Solution

20. A rubber ball dropped from 24 m height loses its kinetic energy by 25%. What is the height to which it rebounds?

A. 6 m

B. 12 m

C. 18 m

D. 24 m

Answer: C



Watch Video Solution

21. A car accelerates from rest with acceleration $1.2m/s^2$. A bus moves with constant speed of 12 mis in a parallel lane. How long does the car take from its start to meet the bus?

A. 17 s

B. 8 s

C. 20 s

D. 12 s

Answer: C



Watch Video Solution

22. If a body travels half the distance with velocity v_1 and next half with velocity v_2 , then

which one of the following will be the average velocity of the body?

A. $\sqrt{v_1 v_2}$

B. $\frac{v_1 + v_2}{2}$

C. $\frac{v_2}{v_1}$

D. $\frac{2v_1 v_2}{v_1 + v_2}$

Answer: D



Watch Video Solution

23. What is the correct sequence in which the lengths of the following units increase?

1. Angstrom 2. Micron 3. Nanometer

Select the correct answer using the code given below:

A. 1, 2, 3

B. 3, 1, 2

C. 1,3, 2

D. 2, 3, 1

Answer: C



Watch Video Solution

24. Which one of the following remains constant while throwing a ball upward?

A. Displacement

B. Kinetic energy

C. Acceleration

D. Velocity

Answer: C



25. Consider the following statements: If the net external torque acting on an object is switched off, then -

1. Linear momentum will remain unchanged.
2. Angular momentum will remain unchanged.

Which of the statements given above is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: B



Watch Video Solution

26. One light year is equal to

A. $9.46 \times 10^{-15}m$

B. $9.46 \times 10^{15}m$

C. $9.46 \times 10^{-13}m$

D. $9.46 \times 10^{13}m$

Answer: B



Watch Video Solution

27. Which one of the following statements correctly defines power?

A. Energy supplied per unit time

B. Energy of an object due to its motion

C. Energy of an object due to its position

D. None of the above

Answer: A



Watch Video Solution

28. A long jumper runs before jumping because he

A. covers a greater distance

B. maintains momentum conservation

C. gains energy by running

D. gains momentum

Answer: B



Watch Video Solution

29. Which among the following is the necessary condition for simple harmonic motion ?

A. Constant period

B. Constant acceleration

C. Displacement and acceleration are proportional

D. Displacement and torque are proportional

Answer: C



Watch Video Solution

30. On planet Earth, there is no centrifugal force at the

A. Equator

B. Tropic of Call cer

C. Tropic of Capricom

D. Poles

Answer: D



Watch Video Solution

31. The weight of a body is 9.8 N at the place where $g = 9.8ms^{-2}$. Its mass is

A. zero

B. 9.8 kg

C. 10 kg

D. 1 kg

Answer: D



Watch Video Solution

32. If a light body and a heavy body have equal momentum, then

A. the lighter body has greater kinetic energy than the heavier body

B. the lighter body has lesser kinetic energy than the heavier body

C. the kinetic energy of the lighter body is equal to the kinetic energy of the heavier body

D. the kinetic energy of both the bodies are independent of momentum

Answer: C



Watch Video Solution

33. An object of mass 5 kg is attached to the end of a rope. If the rope is pulled upward with an acceleration 0.30ms^{-2} , what is the tension in the rope?

A. 30.5 N

B. 40.5 N

C. 50.5 N

D. 60.5 N

Answer: C



Watch Video Solution

34. When a mass m is hung on a spring, the spring stretched by 6 cm. If the loaded spring is pulled downward a little and released, then the period of vibration of the system will be

A. 0.27 s

B. 0.35 s

C. 0.49 s

D. 0.64 s

Answer: C



Watch Video Solution

35. A book is kept on the surface of a table. If the gravitational pull of the earth on the book is the force of action, then the force of reaction is exerted by

A. the book on the table

B. the book on the earth

C. the table on the book

D. the table on the earth

Answer: C



Watch Video Solution

36. In the relation $\alpha + \beta t + \lambda$, α and λ are measured in meter (m) and t is measured in second (s). The SI unit of β must be

A. m

B. ms

C. s

D. ms^{-1}

Answer: D



Watch Video Solution

37. A spring has length ' l ' and spring constant ' k '. It is cut into two pieces of lengths

l_1 and l_2 such that $l_1 = nl_2$. The force constant of the spring of length l_1 is

A. $k(l+n)$

B. k

C. $\frac{k}{(n+1)}$

D. $\frac{k(n+l)}{n}$

Answer: D



Watch Video Solution

38. A body is thrown vertically upwards and then falls back on the ground. Its potential energy is maximum

A. on the ground

B. at the maximum height

C. during the return journey

D. both on the ground and at the maximum height

Answer: B





Watch Video Solution

39. Which one of the following pairs does not have the same dimension?

A. potential energy and kinetic energy

B. Density and specific gravity

C. Focal length and height

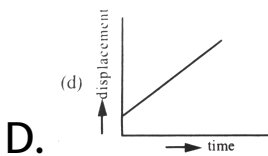
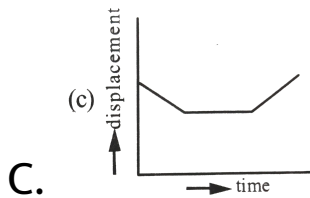
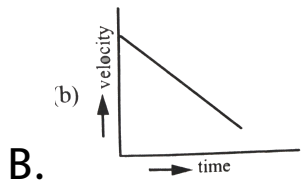
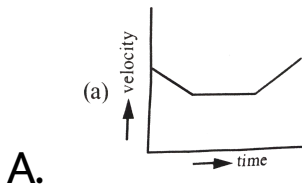
D. Gravitational force and frictional force

Answer: B



Watch Video Solution

40. Which one of the following graphs represents motion?



Answer: D



Watch Video Solution

41. For a simple pendulum in simple harmonic motion, which of the following statements is/are correct?

1. The kinetic energy is maximum at the mean position.
2. The potential energy is maximum at the mean position.
3. Acceleration is maximum at the mean

position. Select the correct answer using the code given below: Code:

A. 1 only

B. 2 only

C. 1 and 3

D. 2 and 3

Answer: A



Watch Video Solution

42. A man is sitting on a rotating stool with his arms outstretched. If suddenly he folds his arms the angular velocity of the man would

- A. increase
- B. decrease
- C. become zero
- D. remain constant

Answer: A



Watch Video Solution

43. For a particle revolving in a circular path, the acceleration of the particle is

A. along the tangent

B. along the radius

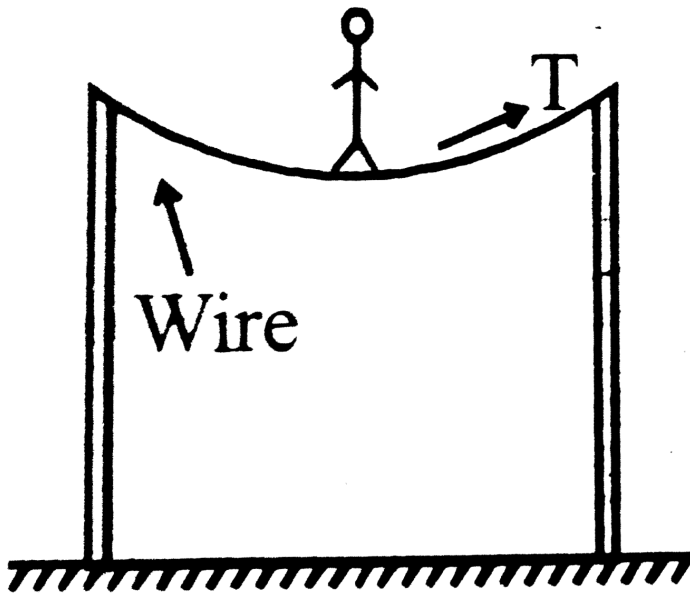
C. zero

D. along the circumference of the circle

Answer: B



Watch Video Solution



44.

A circus performer of mass M is walking along a wire as shown in the figure given above. The tension T in the wire is (g = acceleration due to gravity)

A. approximately Mg

B. less than Mg

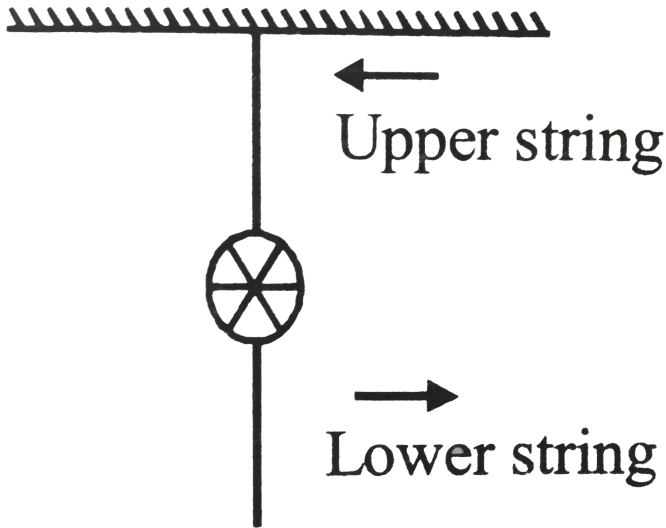
C. more than Mg

D. depends on whether the performer stands on one or two feet

Answer: B



Watch Video Solution



45.

A heavy ball is suspended as shown in the figure given above. A quick jerk on the lower string will break that string but a slow pull on the lower string will break the upper string. The first result occurs because

A. the force is too small to move the ball

B. air friction holds the ball back

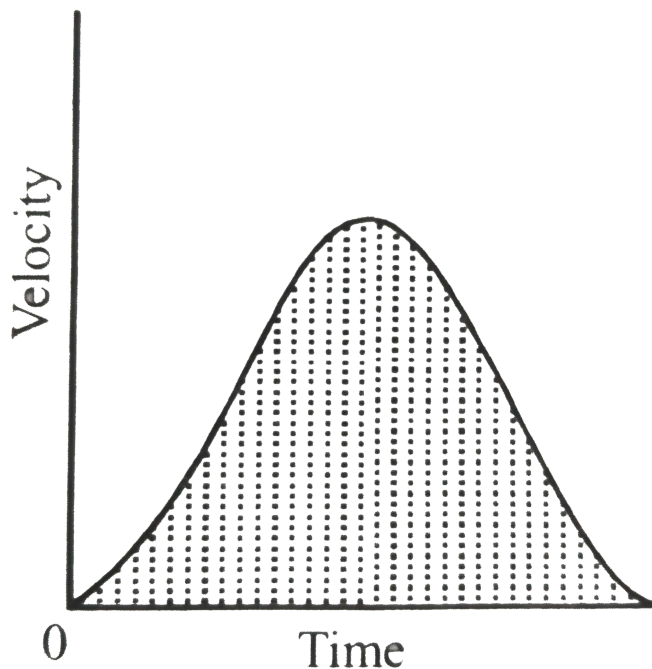
C. of action and reaction

D. the ball has inertia

Answer: D



Watch Video Solution



46.

Which one of the following characteristics of the particle does the shaded area of the velocity-time graph shown above represent?

A. Momentum

B. Acceleration

C. Distance covered

D. speed

Answer: C



Watch Video Solution

47. A body is at rest on the surface of the earth. Which one among the following statements is correct regarding this?

A. No force is acting on the body

B. Only weight of the body acts on it

C. Net downward force is equal to the net upward force

D. None of the above

Answer: C



Watch Video Solution

48. A pendulum beats, faster than a standard pendulum. In order to bring it to the standard beat, the length of th pendulum is to be

A. reduced

B. increased

C. reduced and the mass of the bob
increased

D. reduced and also the mass of the bob
reduced

Answer: A



Watch Video Solution

49. A body initially at rest is acted upon by a constant force. The rate of change of its kinetic energy varies

A. linearly with square root of time

B. linearly with time

C. linearly with square of time

D. inversely with time

Answer: D



Watch Video Solution

50. A jet plane flies through air with a velocity of 2 Mach. While the velocity of sound is 332 m/s, the air speed of the plane is

A. 166 m/s

B. 66.4 km/s

C. 332 m/s

D. 664 m/s

Answer: D



Watch Video Solution

51. A man is at rest in the middle of a pond on perfectly smooth ice. He can get himself to the shore by making use of Newton's

A. first law of motion

B. second law of motion

C. third law of motion

D. first, second and third laws of motion

Answer: C



Watch Video Solution

52. When a moving bus suddenly applies brakes, the passengers sitting in it fall in the forward direction. This can be explained by

- A. the theory of relativity
- B. Newton's first law
- C. Newton's second law
- D. Newton's third law

Answer: B



Watch Video Solution

53. A jet engine works on the principle of conservation of

- A. linear momentum
- B. angular momentum
- C. energy
- D. mass

Answer: A



Watch Video Solution

54. Mass of B is four times that of A. B moves with a velocity half that of A. Then, B has

A. kinetic energy equal to that of A

B. half the kinetic energy of A

C. twice the kinetic energy of A

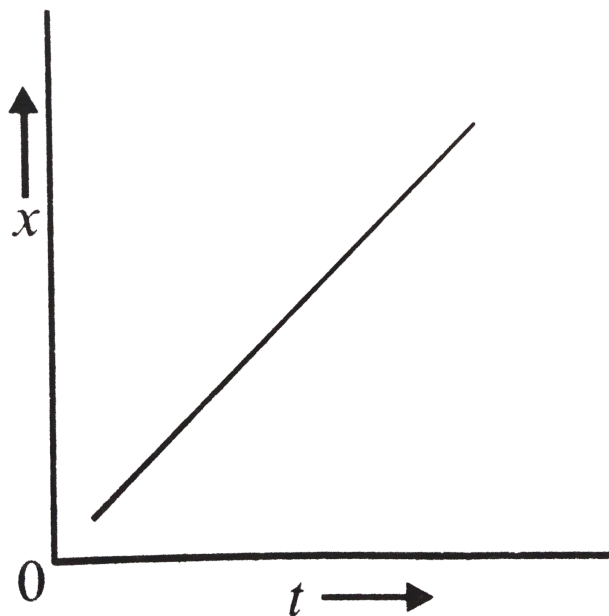
D. kinetic energy one-fourth of A

Answer: A



Watch Video Solution

55. The position- time ($x - t$) graph for motion of a body is given below:



Which one among the following is depicted by the above graph?

A. Positive acceleration

B. Negative acceleration

C. Zero acceleration

D. None of the above

Answer: C



Watch Video Solution

56. Momentum of a body is

1. a vector quantity.
2. a conserved quantity in an isolated system.
3. same as force in linear motion.

Select the correct answer using the code given

below:

A. 1 and 3 only

B. 2 and 3 only

C. 1 and 2 only

D. 1, 2 and 3

Answer: C



Watch Video Solution

57. The ratio of the weight of a man in a stationary lift and when it is moving downward with uniform acceleration ' a ' is 3:2. The value of ' a ' is (g - Acceleration due to gravity of the earth)

A. $3g/2$

B. $g/3$

C. g

D. $2g/3$

Answer: B



Watch Video Solution

58. A body is thrown upward against the gravity 'g' with initial velocity 'u'. Which one among the following is the correct expression for its final velocity when attains the maximum height?

A. $u^2 / (2g)$

B. $2g / u^2$

C. $u^2 g / 2$

D. None of the above

Answer: D



Watch Video Solution

59. Which one among the following is the correct value of the gravitational force of the Earth acting on a body of mass 1 kg?

A. 8.9 N

B. 9.8 N

C. 89 N

D. 98 N

Answer: B



Watch Video Solution

60. It is impossible for two oscillators, each executing simple harmonic motion, to remain in phase with each other if they have different

A. time periods

B. amplitudes

C. spring constants

D. kinetic energy

Answer: A



Watch Video Solution

61. Which one among the following is correct for resultant of balanced forces?

A. It is zero

B. It is non-zero

C. It varies continuously

D. None of the above

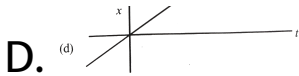
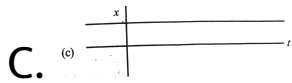
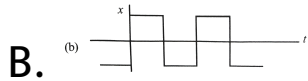
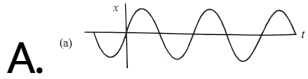
Answer: A



Watch Video Solution

62. An object is in uniform circular motion on a plane. Suppose that you measure its displacement from the centre along one direction, say, along the x-axis. Which one

among the following graphs could represent this displacement (x)?



Answer: A



Watch Video Solution

63. A body attached to a spring balance weighs 10 kg on the Earth. The body attached to the same spring balance is taken to a planet where gravity is half that of the Earth.

The balance will read

A. 20 kg

B. 10 kg

C. 5 kg

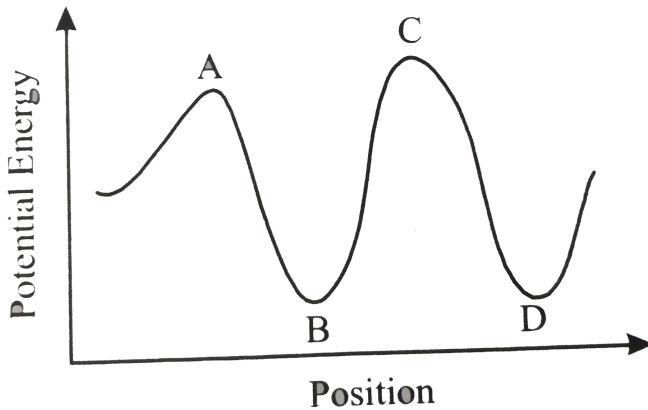
D. 2.5 kg

Answer: B



Watch Video Solution

64. Consider the following figure :



Which of the following labelled points in the figure given above indicate unstable state of an object ?

A. Point A only

B. Point B only

C. Points A and C

D. Points B and D

Answer: D



Watch Video Solution

65. One feels heavier in a lift when the lift

A. is going down steadily

B. just begins to go up

C. is moving up steadily

D. descends freely

Answer: B



Watch Video Solution

66. A swinging pendulum has its maximum acceleration at

A. the bottom of the swing

B. the two extremities of the swing

C. every point on the swing

D. no particular portion of the pendulum

Answer: B



Watch Video Solution

67. An iron ball and a wooden ball of the same radius are released from a height 'H' in vacuum. The time taken to reach the ground will be

- A. more for the iron ball
- B. more for the wooden ball
- C. equal for both
- D. in the ratio of their weights

Answer: C



Watch Video Solution

68. A body weighs 5 kg on equator. At the poles it is likely to weigh

A. 5 kg

B. less than 5 kg but not zero

C. 0 kg

D. more than 5 kg

Answer: D



Watch Video Solution

69. A staircase has 5 steps each 10 cm high and 10 cm wide. What is the minimum horizontal velocity to be given to the ball so that it hits

directly the lowest plane from the top of the staircase? ($g = 10ms^{-2}$)

A. $2ms^{-1}$

B. $1ms^{-1}$

C. $\sqrt{2}ms^{-1}$

D. $\frac{1}{2}ms^{-1}$

Answer: B



Watch Video Solution

70. For a simple pendulum, the graph between T^2 and L (where T is the time period & L is the length) is

- A. straight line passing through origin
- B. parabolic
- C. circle
- D. none of the above

Answer: A



Watch Video Solution

71. The displacement of a particle is given by

$$x = \cos^2 \omega t. \text{ The motion is}$$

- A. simple harmonic
- B. periodic but not simple harmonic
- C. periodic but not simple harmonic
- D. None of the above

Answer: A



Watch Video Solution

72. A motor vehicle is moving on a circle with a uniform speed. The net acceleration of the vehicle is

A. zero

B. towards the centre of circle

C. away from the centre along the radius of the circle

D. perpendicular to the radius and along the velocity

Answer: B



Watch Video Solution

73. An object is undergoing a non-accelerated motion. Its rate of change of momentum is

A. a non-zero constant

B. zero

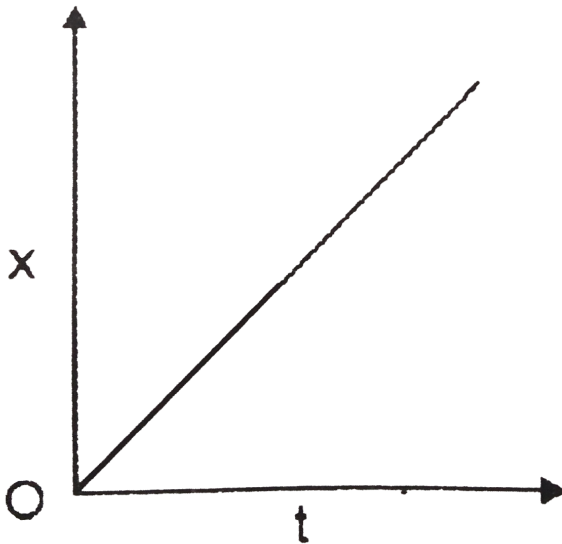
C. not a constant

D. None of the above

Answer: B



74. The motion of a particle is given by a straight line in the graph given above drawn with displacement (x) and time (t). Which one among the following statements is correct ?



A. The velocity of the particle is uniform

B. The velocity of the particle is non-uniform

C. The speed is uniform and the particle is moving on a circular path

D. The speed is non-uniform and the particle is moving on a straight line path

Answer: A



Watch Video Solution

75. A car is moving with a uniform speed. However its momentum is changing. Then the car

A. may be on an elliptical path

B. is moving on a straight path without acceleration

C. is moving on a straight path with acceleration

D. is moving without any acceleration

Answer: A



Watch Video Solution

76. An ant is moving on thin (negligible thickness) circular wire. How many coordinates do you require to completely describe the motion of the ant?

A. One

B. Two

C. Three

D. Zero

Answer: B



Watch Video Solution

77. If d denotes the distance covered by a car in time t and \vec{s} denotes the displacement by the car during the same time, then :

A. $d \leq \left| \vec{s} \right|$

B. $d = \left| \vec{s} \right|$ only

C. $d \geq \left| \vec{S} \right|$

D. $d \leq \left| \vec{S} \right|$

Answer: C



Watch Video Solution

78. If an object undergoes a uniform circular motion, then its

A. acceleration remains uniform

B. velocity changes

C. speed changes

D. velocity remains uniform

Answer: B



Watch Video Solution

79. A force F is applied on a body (which moves on a straight line) for a duration of 3 s. The momentum of the body changes from 10 g cm/s to 40 g cm/s. The magnitude of the force F is

A. 10 dyne

B. 10 newton

C. 120 dyne

D. 12 dyne

Answer: A



Watch Video Solution

80. A particle is moving freely. Then its

A. kinetic energy is always greater than zero

B. potential energy is greater than zero and kinetic energy is less than zero

C. potential energy is less than zero and kinetic energy is greater than zero

D. potential energy is zero and kinetic energy is less than zero

Answer: A



Watch Video Solution

81. The displacement of a particle at time t is given by

$$\vec{x} = a\hat{i} + bt\hat{j} + \frac{C}{2}t^2\hat{k}$$

where a , b and C are positive constants. Then the particle is

A. accelerated along \hat{k} direction

B. decelerated along \hat{k} direction

C. decelerated along \hat{j} direction

D. accelerated along \hat{j} direction

Answer: A



Watch Video Solution

82. Gravitational force shares a common feature with electromagnetic force. In both cases, the force is

- A. between massive and neutral objects
- B. between charged objects
- C. a short range
- D. a long range

Answer: D



Watch Video Solution

83. The spread in colours in a rainbow on sky is primarily due to

A. dispersion of sunlight

B. reflection of sunlight

C. refraction of sunlight

D. total internal reflection of sunlight

Answer: A



Watch Video Solution

84. Assertion (A): An inflated rubber balloon with different loads tied at the bottom can float at different depths inside water.

Reason (R) : At a particular depth its weight is equal to the weight of the water displaced.

A. Both A and R are individually true and R is the correct explanation of A

B. Both A and R are individually true but R

is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A



Watch Video Solution

85. Assertion (A) : Two artificial satellites having different masses and revolving around the Earth in the same circular orbit have same

speed.

Reason (R) : The speed of a satellite is directly proportional to the radius of its orbit.

A. Both A and R are individually true and R

is the correct explanation of A

B. Both A and R are individually true but R

is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: C





Watch Video Solution

86. The weight of an object m may be assigned by using Newton's

- A. first law of motion.
- B. second law of motion.
- C. third law of motion.
- D. laws of gravitation.

Answer: D



Watch Video Solution

87. Power required by a boy of mass 30 kg to run up a staircase of 40 steps in 10 seconds is' (Height of each step is 15 cm)

(Take $g = 10m / s^2$)

A. 1800 Watt

B. 180 Watt

C. 18000 Watt

D. 18 Watt

Answer: B



Watch Video Solution

88. A piece of paper and a coin both having the same mass are dropped from the 10th floor of building. The piece of paper would take more time to reach the ground because

A. gravitational pull on the paper is less than the coin.

B. buoyant force on the piece of paper is more than that on the coin.

C. buoyant force on the coin is more and acts in the downward direction.

D. the piece of paper takes a longer path to reach the ground.

Answer: B



Watch Video Solution

89. Motion, of a particle can be described in x-direction by $x=a \sin \omega t$ and y-direction by $y=b \cos \omega t$. The particle is moving on

A. a circular path of radius 'a'.

B. a circular path of radius 'b'.

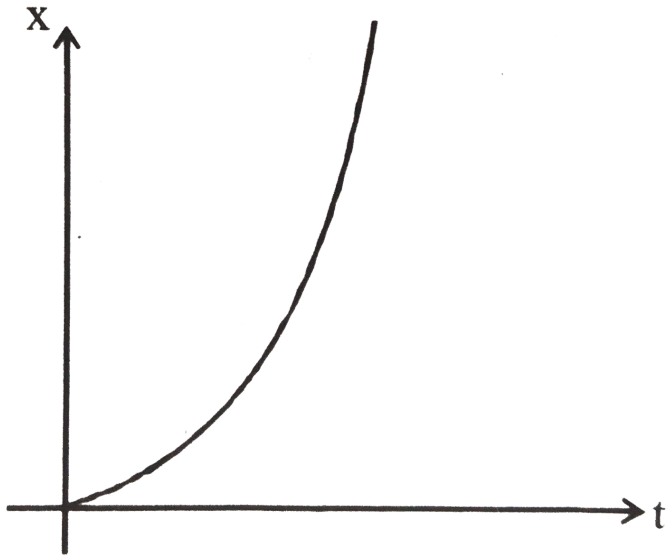
C. an elliptical path.

D. a straight line.

Answer: C



Watch Video Solution



The plot given above represents displacement 'x' of a particle with time 't'. The particle is

- A. moving with uniform velocity.
- B. moving with acceleration.
- C. moving with deceleration.

D. executing a periodic motion.

Answer: B



Watch Video Solution

91. A bullet of mass 20 gm is fired in the horizontal direction with a velocity 150 mis from a pistol of mass 1 kg. Recoil velocity of the pistol is

A. 3 m/s

B. 3 km/s

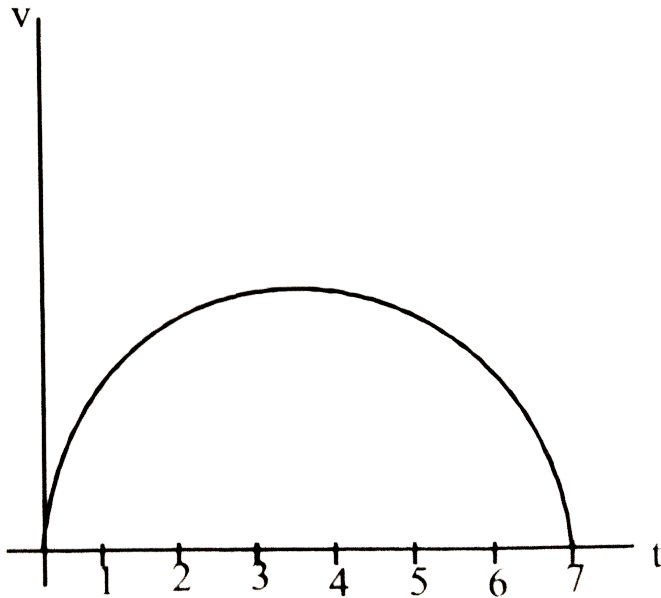
C. 300 m/s

D. 1/3 m/s

Answer: A



Watch Video Solution



92.

The plot given above represents the velocity of a particle (in m/s) with time (in seconds). Assuming that the plot represents a semi-circle, distance traversed by the particle at the end of 7 seconds is approximately.

A. 19 m

B. 7 m

C. 3.2 m

D. 4.75 m

Answer: A



Watch Video Solution

93. Suppose we have an iron nail and an iron ball of same mass. When submerged in water,

the iron ball may float but the nail always sinks.

This is because

A. buoyant force on the ball is larger than that of the nail due to their shapes.

B. viscous force on the ball is higher.

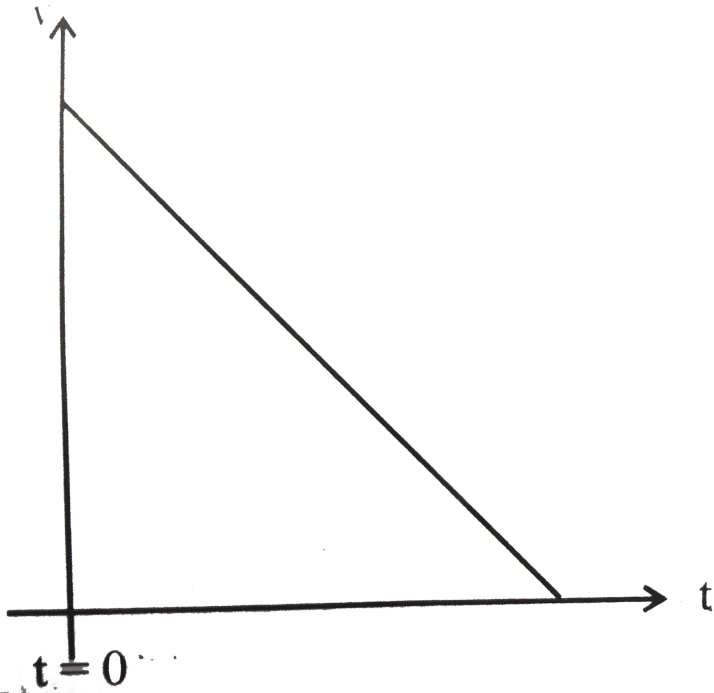
C. viscous force on the nail is higher.

D. gravitational force affects the ball differently from the nail.

Answer: A



Watch Video Solution



94.

Which one among the following situation is best represented by the velocity - time plot shown above?

A. Uniform motion of a particle on a circle

B. Accelerated motion of a particle which has a non-zero initial velocity

C. Decelerated motion of a particle which has an initial non-zero velocity

D. Decelerated motion of a particle which has no initial velocity

Answer: C



Watch Video Solution

95. Statement I: The acceleration due to gravity decreases with increase in height from the surface of the Earth.

Statement II: The acceleration due to gravity is inversely proportional to the square of the distance from the centre of the Earth.

A. A. Both statements 1 & 2 are individually correct and statement 2 is correct explanation of statement 1.

B. Both statements 1 & 2 are individually correct and statement 2 is not correct explanation of statement 1.

C. Statement 1 is true but statement 2 is false.

D. Statement 1 is false but statement 2 is true.

Answer: A



Watch Video Solution

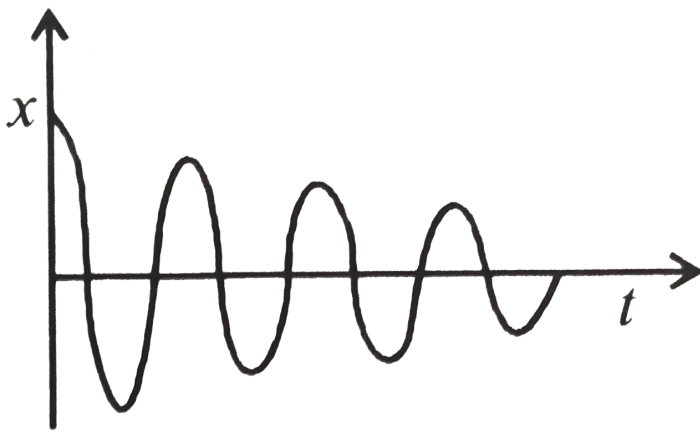
96. Bernoulli's principle is based on which one among the following laws?

- A. Conservation of mass
- B. Conservation of momentum
- C. Conservation of angular momentum
- D. Conservation of energy

Answer: D



Watch Video Solution



97.

The displacement (x)-time (t) graph given above approximately represents the motion of a

- A. simple pendulum placed in a vacuum
- B. simple pendulum immersed in water
- C. simple pendulum placed in outer space
- D. point mass moving in air

Answer: B



Watch Video Solution

98. Planet A has double the radius than that of Planet B. If the mass of Planet A is 4 times heavier than the mass of Planet B, which of the following statements regarding weight of an object is correct?

A. Heavier on Planet A than on Planet B

B. Heavier on Planet B than on Planet A

C. Same on both the Planets

D. Cannot be measured on Planet B

Answer: C



Watch Video Solution

99. A passenger in a moving train tosses a coin which falls behind him. It means that motion of the train is

A. accelerated

B. uniform

C. retarded

D. along the circular tracks

Answer: A



Watch Video Solution

100. How many cubic centimeters (cm^3) are in a cubic metre (m^3)?

A. 10^3

B. 10^6

C. 10^9

D. 10^{12}

Answer: B



Watch Video Solution

101. If the distance S covered by a moving car in rectilinear motion with a speed v in time t is given by $S = vt$, then the car undergoes

- A. a uniform acceleration
- B. a non-uniform acceleration
- C. a uniform velocity
- D. a non-uniform velocity

Answer: C



Watch Video Solution

102. Statement I: A body moving in a circular path is acted upon by the centripetal force.

Statement II: Centripetal force acting on the

body is doing work to keep it rotating in the circular path.

A. Both the statements are individually true and Statement II is the correct explanation of Statement I.

B. Both the statements are individually true but Statement II is not the correct explanation of Statement I.

C. Statement I is true but Statement II is false

D. Statement I is false but Statement II is true.

Answer: C



Watch Video Solution

103. If the motion of an object is represented by a straight line parallel to the time axis in a distance-time graph, then the object undergoes

- A. an acceleration motion
- B. a decelerated motion
- C. a uniform non-zero velocity motion
- D. a zero velocity motion

Answer: D



Watch Video Solution

104. A force \vec{F} acting on an electric charge q , in presence of an electromagnetic field, moves the charge parallel to the magnetic field with

velocity \vec{v} . The \vec{F} is equal to (where \vec{E} and \vec{B} are electric field and magnetic field respectively)

A. $q\vec{E}$

B. $q(\vec{v} \times \vec{B})$

C. $q(\vec{v} \times \vec{E})$

D. $q\vec{B}$

Answer: A



Watch Video Solution

105. Two bodies of masses m and $4m$ are moving with equal linear momenta. The ratio of their kinetic energies is :

A. 1 : 4

B. 4 : 1

C. 1 : 1

D. 1 : 2

Answer: B



Watch Video Solution

106. A force $\vec{F} = (6\hat{i} - 8\hat{j} + 10\hat{k})N$

produces acceleration of $1ms^2$ in a body.

Calculate the mass of the body.

A. 10 kg

B. $10\sqrt{2}kg$

C. $2\sqrt{10}kg$

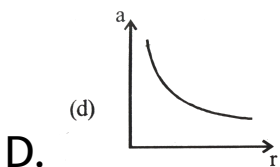
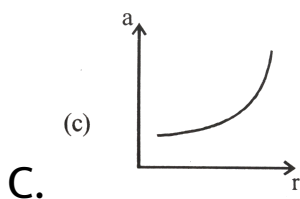
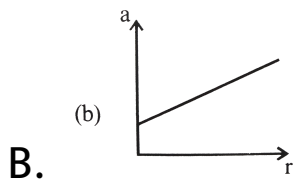
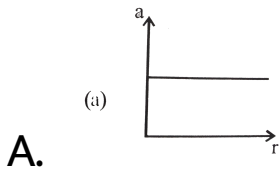
D. 8kg

Answer: B



Watch Video Solution

107. A particle is moving in a circular path of radius r at a constant speed v . Which one of the following graphs correctly represents its acceleration a ?



Answer: D



Watch Video Solution

108. Two cars A and B have masses m_A and m_B respectively, with $m_A > m_B$.

Both the cars are moving in the same direction with equal kinetic energy. If equal braking force is applied on both, then before coming to rest

A. A will cover a greater distance

B. B will cover a greater distance

C. both will cover the same distance

D. distance covered by them will depend on their respective velocities

Answer: B



Watch Video Solution

109. If the length of the Equator is about 40000 km and the velocity of rotation is about

1700 km per hour, what would be the velocity of rotation at the Pole?

A. Zero

B. 850 km/hr

C. 1700 km/hr

D. 3400 km/hr

Answer: A



Watch Video Solution

110. A bullet is fired vertically up from a 400 m tall tower with a speed 80 m/s. If g is taken as 10 m/s^2 , the time taken by the bullet to reach the ground will be

A. 8 s

B. 16 s

C. 20 s

D. 24 s

Answer: C



Watch Video Solution

111. Three liquids of densities d , $2d$, and $3d$ are mixed in equal volumes. Then the density of the mixture is

A. $6D$

B. $1.4D$

C. $2D$

D. $3D$

Answer: C





112. A particle is moving with uniform acceleration along a straight line ABC, where $AB = BC$. The average velocity of the particle from A to B is 10 m/s and from B to C is 15 m/s. The average velocity for the whole journey from A to C in m/s is

A. 12

B. 12.5

C. 13

D. 13.5

Answer: A



Watch Video Solution

113. Statement I: A body weighs less on a hill top than on earth's surface even though its mass remains unchanged.

Statement II: The acceleration due to gravity of the earth decreases with height.

A. Both the statements are individually true and Statement II is the correct explanation of Statement I

B. Both the statements are individually true but Statement II is not the correct explanation of Statement I

C. Statement I is true but Statement II is false

D. Statement I is true but Statement II is true

Answer: A



Watch Video Solution

114. If the radius of the earth were to shrink by 1% its mass remaining the same, the acceleration due to gravity on the earth's surface would

A. 0.01

B. 0.02

C. 0.03

D. 0.04

Answer: A



Watch Video Solution

115. The displacement-time graph of a particle acted upon by a constant force is

A. a straight line

B. a circle

C. a parabola

D. any curve depending upon initial conditions

Answer: C



Watch Video Solution

116. Which one of the following is not a result of surface tension?

A. Nearly spherical drop of rain

B. Capillary rise

C. Removal of dirt by soap or detergent

D. Flow of a liquid

Answer: D



Watch Video Solution

117. A person stands on his two feet over a surface and experiences a pressure P . Now the person stands on only one foot. He would experience a pressure of magnitude

A. $4P$

B. P

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

D. $2P$

Answer: D



Watch Video Solution

118. A deep sea diver may hurt his ear drum during diving because of

- A. lack of oxygen
- B. high atmospheric pressure
- C. high water pressure
- D. All of these

Answer: C



Watch Video Solution

119. A brass ball is tied to a thin wire and swung so as to move uniformly in a horizontal circle. Which of the following statements in

this regard is/are true?

1. The ball moves with constant velocity
2. The ball moves with constant speed
3. The ball moves with constant acceleration
4. The magnitude of the acceleration of the ball is constant

Select the correct answer using the code given below:

A. 1 only

B. 1 and 3

C. 1, 2 and 4

D. 2 and 4 only

Answer: D



Watch Video Solution

120. Which one of the following statements is not correct?

A. If the velocity and acceleration have opposite sign, the object is slowing down

B. If the velocity is zero at an instant, the acceleration should also be zero at that instant

C. If the velocity is zero for a time interval, the acceleration is zero at any instant within the time interval

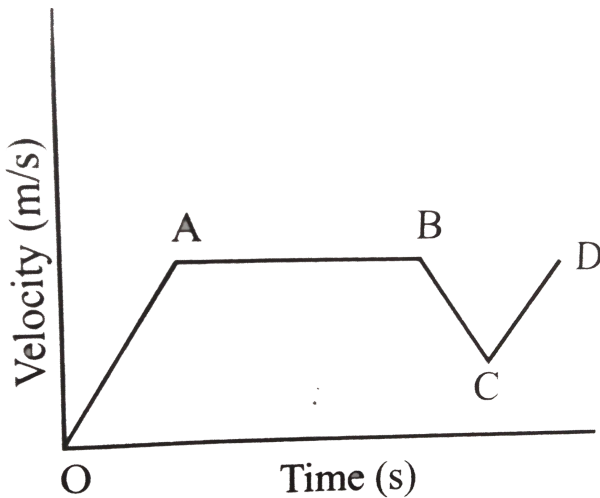
D. If the position and velocity have opposite sign, the object is moving towards the origin

Answer: B



Watch Video Solution

121. The following figure represents the velocity-time graph of a moving car on a road:



Which segment of the graph represents the retardation?

A. AB

B. BC

C. CD

D. none

Answer: B



Watch Video Solution

122. A man is sitting in a train which is moving with a velocity of 60 km/hour. His speed with respect to the train is:

A. $10/3$ m/s

B. 60 m/s

C. infinite

D. zero

Answer: D



Watch Video Solution

123. Conservation of momentum in a collision between particles can be understood on the basis of:

A. Newton's first law of motion

B. Newton's second law of motion only

C. Both Newton's second law of motion and

Newton's third law of motion

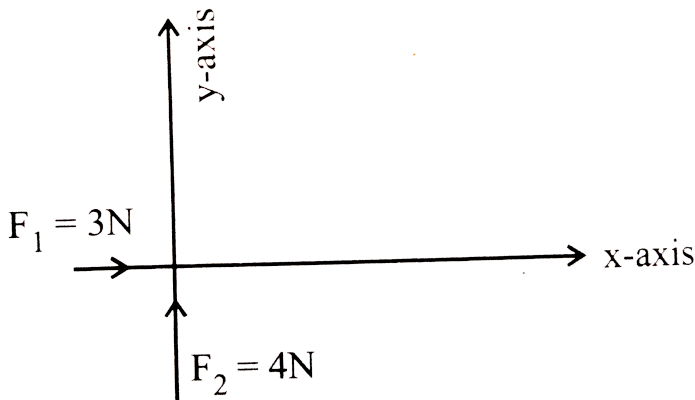
D. Conservation of energy

Answer: C



Watch Video Solution

124. Two forces, one of 3 newton and another of 4 newton are applied on a standard 1 kg body, placed on a horizontal and frictionless surface, simultaneously along the x-axis and the y-axis, respectively, as shown below:



The magnitude of the resultant acceleration is:

A. $7 \frac{m}{s^2}$

B. $1 \frac{m}{s^2}$

C. $5 \frac{m}{s^2}$

D. $\sqrt{7} \frac{m}{s^2}$

Answer: C



Watch Video Solution

125. In SI unit of force 'Newton' (N) is given by (where m stands for metre and S stands for second):

A. $IN = 1kg / ms^{2n}$

B. $lN = 1kgm / s^2$

C. $lN = 1kgs^2 / m$

D. $IN = 1kgms^2$

Answer: B



Watch Video Solution

126. The acceleration due to gravity 'g' for objects on or near the surface of earth is related to the universal gravitational constant

'G' as ('M' is the mass of the earth and 'R' is its radius):

A. $G = \frac{g(M)}{R^2}$

B. $g = G \frac{M}{R^2}$

C. $M = \frac{gG}{R^2}$

D. $R = \frac{gG}{M^2}$

Answer: B



Watch Video Solution

127. Suppose the force of gravitation between two bodies of equal masses is F . If each mass is doubled keeping the distance of separation between them unchanged, the force would become

A. F

B. $2F$

C. $4F$

D. $\frac{1}{4}F$

Answer: C



Watch Video Solution

128. A body has a free fall from a height of 20 m. After falling through a distance of 5 m, the body would

- A. lose one-fourth of its total energy
- B. lose one-fourth of its potential energy
- C. gain one-fourth of its potential energy
- D. gain three-fourth of its total energy

Answer: B



Watch Video Solution

129. Mass of a particular amount of substance

1. is the amount of matter present in it.

2. does not vary from place to place.

3. changes with change in gravitational force.

Select the correct answer using the code given

below:

A. 1, 2 and 3

B. 1 and 2 only

C. 2 and 3 only

D. 1 only

Answer: B



Watch Video Solution

130. Two bod'ies A and B are moving with equal velocities. The mass of B is double that of A. In this context, which one of the following statements is correct?

A. Momentum of B will be double that of A.

- B. Momentum of A will be double that of B
- C. Momentum of B will be four times that of A.
- D. Momenta of both A and B will be equal.

Answer: A



Watch Video Solution

131. A glass vessel is filled with water to the rim and a lid is fixed to it tightly. Then it is left

inside a freezer for hours. What is expected to happen ?

A. The water freezes to ice and the level of ice comes down

B. The water in the glass vessel simply freezes to ice

C. The glass vessel breaks due to expansion as water freezes to ice

D. The water does not freeze at all

Answer: C



Watch Video Solution

132. A racing car accelerates on a straight road from rest to a speed of 50 mis in 25 s. Assuming uniform acceleration of the car throughout, the distance covered in this time will be

A. 625 m

B. 1250 m

C. 2500 m

D. 50 m

Answer: A



Watch Video Solution

133. A man weighing 70 kg is coming down in a lift. If the cable of the lift breaks suddenly, the weight of the man would become

A. 70 kg

B. 35 kg

C. 140 kg

D. zero

Answer: D



Watch Video Solution

134. The impulse on a particle due to a force acting on it during a given time interval is equal to the change in its

A. force

B. momentum

C. work done

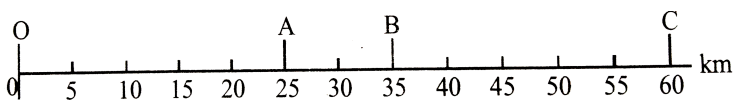
D. energy

Answer: B



Watch Video Solution

135. The motion of a car along a straight path is shown by the following figure:



The car starts O and reaches at A, B and C at

different instants of time. During its motion from O to C and back to B, the distance covered and the magnitude of the displacement are, respectively

A. 25 km and 60 km

B. 95 km and 35 km

C. 60 km and 25 km

D. 85 km and 35 km

Answer: D



Watch Video Solution

136. The speed of a car travelling on a straight road is listed below at successive intervals of 1 is :

Time(s)	0	1	2	3	4
Speed (m/s)	0	2	4	6	8

Which of the following is/are correct? The car travels

1. with a uniform acceleration of 2 m/s^2 .
2. 16 m in 4 s.
3. with an average speed of 4 m/s.

Select the correct answer using the code given below:

A. 1 , 2 and 3

B. 2 and 3 only

C. 1 and 2 only

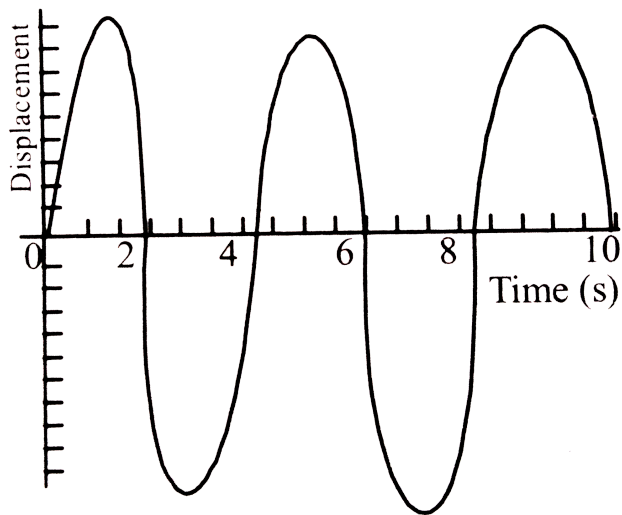
D. 1 only

Answer: A



Watch Video Solution

137. The following figure shows displacement versus time curve for a particle executing simple harmonic motion :



Which one of the following statements is correct?

A. Phase of the oscillating particle is same

at $t = 1$ s and $t = 3$ s

B. Phase of the oscillating particle is same

at $t = 2$ s and $t = 8$ s

C. Phase of the oscillating particle is same

at $t = 3 \text{ s}$ and $t = 7 \text{ s}$

D. Phase of the oscillating particle is same

at $t = 4 \text{ s}$ and $t = 10 \text{ s}$

Answer: C



Watch Video Solution

138. The time period of a simple pendulum made using a thin copper wire of length L is T . Suppose the temperature of the room in

which this simple pendulum is placed increases by $30^{\circ} C$, what will be the effect on the time period of the pendulum?

- A. T will increase slightly
- B. T will remain the same
- C. T will decrease slightly
- D. T will become more than 2 times

Answer: A



Watch Video Solution

139. Which one of the following physical quantity has the same unit as that of pressure?

A. Angular momentum

B. Stress

C. Strain

D. Work

Answer: B



Watch Video Solution

140. Which one of the following statements is true for the relation $F = \frac{Gm_1m_2}{r^2}$? (All symbols have their usual meanings)

- A. The quantity G depends on the local value of g , acceleration due to gravity.
- B. The quantity G is greatest at the surface of the Earth
- C. The quantity G is used only when earth is one of the two masses
- D. The quantity G is a universal constant

Answer: D



Watch Video Solution

141. Why is it difficult to measure the coefficient of expansion of a liquid than solid?

A. Liquids tend to evaporate at all temperatures

B. Liquids conduct more heat

C. Liquids expand too much when heated

D. Their containers also expand when heated

Answer: D



Watch Video Solution

142. An object moves in a circular path with a constant speed. Which one of the following statements is correct?

- A. The centripetal acceleration of the object is smaller for a gentle curve (i.e., curve of larger radius) than that for a sharp curve (i.e., curve of smaller radius).
- B. The centripetal acceleration is greater for a gentle curve than that for a sharp curve.
- C. The centripetal acceleration is the same for both the gentle and sharp curves.

D. The centripetal acceleration causes the object to slow down.

Answer: A



Watch Video Solution

143. The force acting on a particle of mass m moving along the x -axis is given by

$$F(x) = Ax^2 - Bx.$$

Which one of the following is the potential energy of the particle?

A. $2Ax - B$

B. $-\frac{x^2}{6}(2Ax - B)$

C. $Ax^3 - Bx^2$

D. Zero

Answer: B



Watch Video Solution

144. In a vacuum, a five-rupee coin, a feather of a sparrow bird and a mango are dropped simultaneously from the same height. The

time taken by them to reach the bottom is t_1 , t_2 and t_3 respectively. In this situation, we will observe that

A. $t_1 > t_2 > t_3$

B. $t_1 > t_3 > t_2$

C. $t_3 > t_1 > t_2$

D. $t_1 = t_2 = t_3$

Answer: D



Watch Video Solution

145. If some object is weighed when submerged in water, what will happen to its weight compared to its weight in air?

A. Increase

B. Decrease

C. Remain exactly the same

D. Increase or decrease cannot be predicted

Answer: B



Watch Video Solution

146. Which one of the following statements about energy is correct?

A. Energy can be created as well as destroyed.

B. Energy can be created but not destroyed.

C. Energy can neither be created nor destroyed.

D. Energy cannot be created but can be destroyed.

Answer: C



Watch Video Solution

147. If an object moves with constant velocity then which one of the following statements is NOT correct?

A. Its motion is along a straight line

B. Its speed changes with time

C. Its acceleration is zero

D. its displacement increases linearly with
time

Answer: A



Watch Video Solution

148. An object is moving with uniform acceleration a . Its initial velocity is u and after time t its velocity is v . The equation of its

motion is $v = u + at$. The velocity (along y-axis) time (along x-axis) graph shall be a straight line

- A. passing through origin
- B. with x-intercept u
- C. with y-intercept u
- D. with slope u

Answer: C



Watch Video Solution

149. Which one of the following has maximum inertia?

A. An atom

B. A molecule

C. A one-rupee coin

D. A cricket ball

Answer: D



Watch Video Solution

150. Which one of the following statements about gravitational force is NOT correct?

A. It is experienced by all bodies in the universe

B. It is a dominant force between celestial bodies

C. It is a negligible force for atoms

D. It is same for all pairs of bodies in our universe

Answer: D



Watch Video Solution

151. Whether an object will float or sink in a liquid, depends on

A. mass of the object only

B. mass of the object and density of liquid only

C. difference in the densities of the object
and liquid

D. mass and shape of the object only

Answer: C



Watch Video Solution

152. Which one of the following statements
about the mass of a body is correct?

A. It changes from one place to another

B. It is same everywhere

C. It depends on its shape

D. It does not depend on its temperature

Answer: B



Watch Video Solution

153. A ball balanced on a vertical rod is an example of

A. stable equilibrium

B. unstable equilibrium

C. neutral equilibrium

D. perfect equilibrium

Answer: A



Watch Video Solution

154. Which of the following statements about a fluid at rest in a cup is/are correct?

1. Pressure is same at all the points in the fluid.
2. Pressure is exerted on the walls.

3. Pressure exists everywhere in the fluid.

Select the correct answer using the code given below:

A. 1 and 2 only

B. 2 and 3 only

C. 1 only

D. 1, 2 and 3

Answer: D



Watch Video Solution

155. A planet has a mass M_1 and radius R_1 .

The value of acceleration- due to gravity on its surface is g_1 . There is another planet 2, whose mass and radius both are two times that of the first planet. Which one of the following is the acceleration due to gravity on the surface of planet 2?

A. g_1

B. $2g_1$

C. $g_1 / 2$

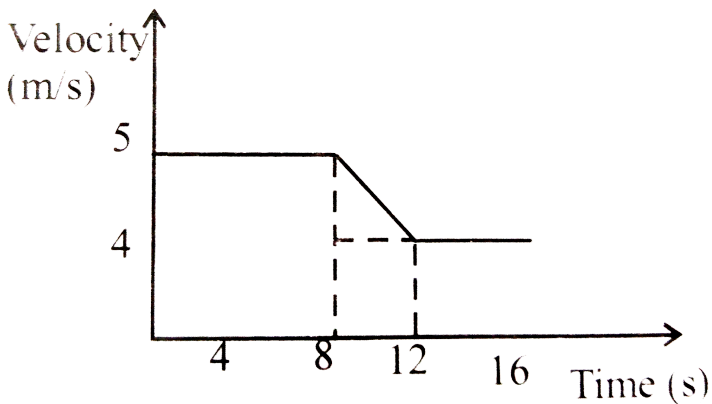
D. $g_1 / 4$

Answer: C



Watch Video Solution

156. Consider the following velocity and time graph:



Which one of the following is the value of average acceleration from 8 s to 12 s?

A. $8m / s^2$

B. $12m / s^2$

C. $2m / s^2$

D. $-1m / s^2$

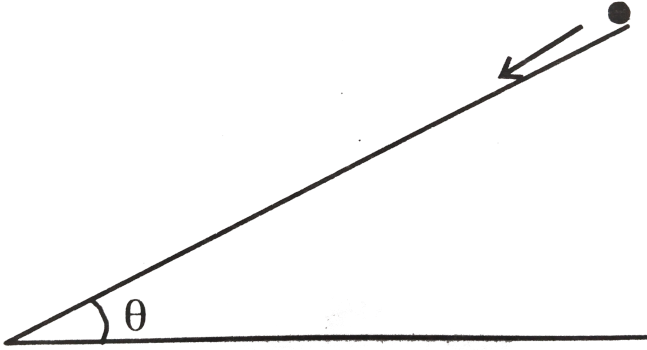
Answer: D



View Text Solution

157. A ball is released from rest and rolls down an inclined plane, as shown in the following figure, requiring 4s to cover a distance of 100

cm along the plane:



Which one of the following is the correct value of angle θ that the plane makes with the horizontal? ($g = 1000 \text{ cm} / \text{s}^2$)

A. $\theta = \sin^{-1}(1/9.8)$

B. $\theta = \sin^{-1}(1/20)$

C. $\theta = \sin^{-1}(1/80)$

D. $\theta = \sin^{-1}(1/100)$

Answer: C



Watch Video Solution

158. The coefficient of a real expansion of a material is $1.6 \times 10^{-5} K^{-1}$. Which one of the following gives the value of coefficient of volume expansion of this material ?

A. $0.8 \times 10^{-5} K^{-1}$

B. $2.4 \times 10^{-5} K^{-1}$

C. $3.2 \times 10^{-5} K^{-1}$

D. $4.8 \times 10^{-5} K^{-1}$

Answer: B



Watch Video Solution

159. Which one of the following energy is stored in the links between the atoms?

A. Nuclear energy

B. Chemical energy

C. Potential energy

D. Thermal energy

Answer: B



Watch Video Solution

160. The correct sequence of energy transfer that occurs when an apple falls to the ground is

A. Gravitational potential energy \rightarrow heat energy to air \rightarrow kinetic energy \rightarrow

heat energy to ground and apple →

sound energy

B. Gravitational potential energy →

sound energy → kinetic energy →

heat energy to air → heat energy to

ground and apple

C. Gravitational potential energy →

kinetic energy → heat energy to air

→ heat energy to ground and apple

→ sound energy

D. Gravitational potential energy →

kinetic energy → sound energy →

heat energy to air → heat energy to

ground and apple

Answer: C



Watch Video Solution

161. Which one of the following forces is non-central and non-conservative ?

- A. Frictional force
- B. Electric force
- C. Gravitational force
- D. Mechanical force

Answer: A



Watch Video Solution

162. Suppose there are two planets, 1 and 2, having the same density but their radii are R_1 and R_2 respectively, where $R_1 > R_2$. The

accelerations due to gravity on the surface of these planets are related as

A. $g_1 > g_2$

B. $g_1 < g_2$

C. $g_1 = g_2$

D. Can't say anything

Answer: A



Watch Video Solution

163. 1 dyne (a unit of force in CGS system)

equals to

A. $10^3 \text{ gcm} / \text{s}^2$

B. $10^{-3} \text{ gcm} / \text{s}^2$

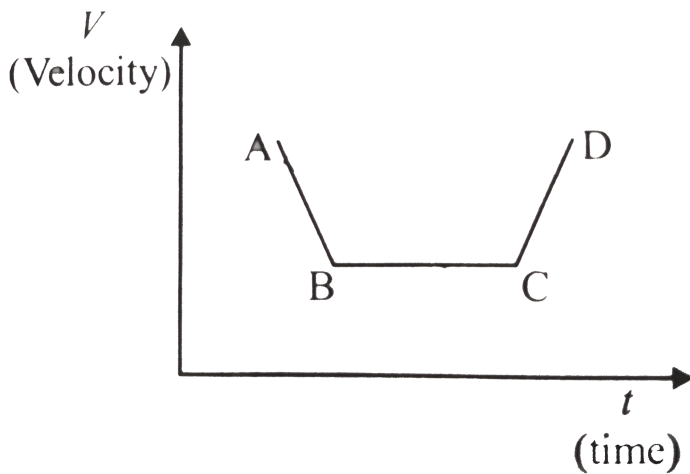
C. $10^5 \text{ kgcm} / \text{s}^2$

D. $10^{-5} \text{ kgcm} / \text{s}^2$

Answer: D



Watch Video Solution



164.

In the given velocity (V) versus time (t) graph, accelerated and decelerated motions are respectively represented by line segments

A. CD and BC

B. BC and AB

C. CD and AB

D. AD and CD

Answer: C



Watch Video Solution