PHYSICS

BOOKS - MCGROW HILL EDUCATION PHYSICS (HINGLISH)

LAWS OF MOTION, FRICTION AND ARCHIMEDES' PRINCIPLE

Elementary Questions Tick The Correct Choice Amongst The Following

1. Impulse is

A. a scalar quantity

B. a vector quantity

C. neigher a scalar nor a vector

D. sometimes a scalar and sometimes a vector

Answer: B

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2. Choose the wrong statement.

A. 1 kg wt=9.8N

B. Momentum is a vector quantity

C. Force is always conserved

D. Momentum is conserved in the absence of an external force

Answer: C

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3. A long jumper runs before jumping because he

A. he covers a greaer distance

B. he maintains momentum conservation

C. he gains energy by running

D. he gains momentum

Answer: D

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4. If a rock is brought from the surface of the moon

A. its mass will change

B. its weight will change, but not mass

C. both mass and weight will change

D. its mass and weight will remain the same

Answer: B

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5. If 1kg wt=10N, the value of gravitational intensity will be

A. $10m/s^2$

B. $\frac{1}{10}m/s^2$

C. $1m/s^2$

D. $\frac{1}{100}m/s^2$

Answer: A

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6. The force acting on a mass of 1 g due to the gravitational pull on the earth is called 1 gwt. One gwt equals

A. 1N

B. 9.8N

C. 980 dyne

D. None of these

Answer: C

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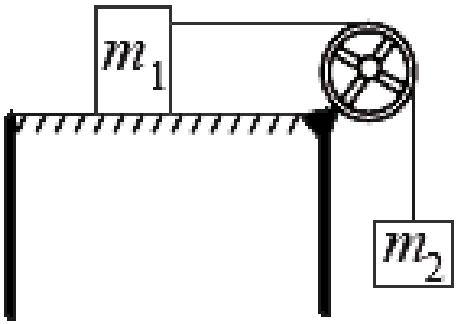
7. Fig. shows a block of mass m_1 resting on a smooth surface. It is connected to a mass m_2 by a string passing over a massless and frictionaless pulleys $m_2 > m_1$. The acceleration of the hanging mass m_2 is :



A. $\dfrac{M_1 g}{M_1 + M_2}$

B. $\dfrac{M_1 + M_2}{M_1 + g}$

C. $\frac{M_2 g}{M_1 + M_2}$

D. None of these

Answer: A

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8. The weight of a body will be zero

A. at the centre of the earth

B. during a free fall

C. in interplanetary space

D. on a frictionless surface

Answer: D

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9. An iron ball and a wooden ball of the same radius are released from a height ‘ h ’ in vacuum. The time taken by both of them to reach the ground is

A. roughly equal

B. unequal

C. exactly equal

D. in the inverse ratio of their diameters

Answer: C

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10. A man is standing on a boat in still water. If he walks towards the shore the boat will

A. move away from the shore

B. remain stationary

C. move towards the shore

D. sink

Answer: A

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11. During a planed manoeuvre in a space flight, a free floating astronaut A pushes another free floating astronaut B, the mass of A being greater than that of B. Then the

magnitude of the force exerted by astronaut A on astronaut B is

A. equal to zero

B. equal to the force exerted by B on A

C. greater than the force exerted by B on A

D. less than the force exerted by B on A

Answer: B

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12. A bullet of mass A and velocity B is fired into a block of wood of mass C. If loss of any mass and friction be neglected, the velocity of the system must be

A. $\frac{AB}{A+C}$

B. $\frac{A+C}{B+C}$

C. $\frac{AC}{B+C}$

D. $\frac{A+B}{AC}$

Answer: A

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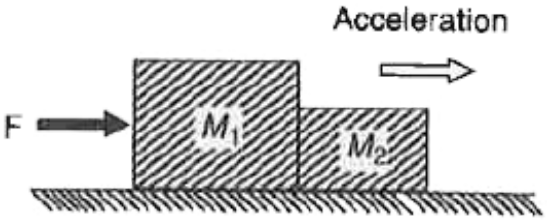
13. A single horizontal force F is applied to a block of mass M_1 which is in contact with another block of mass M_2. If the surfaces are frictionless, the force between the blocks is



A. $\frac{M_1 F}{M_2}$

B. $\frac{M_1 M_2 g}{M_1 + M_2}$

C. $\frac{M_2 F}{M_1 + M_2}$

D. None of these

Answer: C

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14. A driver accelerates his car first at the rate of $1.8m/s^2$ and then at the rate of $1.2m/s^2$. The ratio of the forces exerted by the engines will be respectively equal to

A. $2:3$

B. $1:2$

C. $2:1$

D. $3:2$

Answer: D

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15. A body of mass 5 kg undergoes a change in speed from 30 to 40m/s. Its momentum would increase by

A. 50kgm/s

B. 75 kgm/s

C. 150 kgm/s

D. 350 kgm/s

Answer: A

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16. The force needed to produce an acceleration of $6m/s^2$ in a ball of mass 4 kg will be

A. 24N

B. 30N

C. 32N

D. 36N

Answer: A

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17. A body of mass 5kg undergoes a change in speed from 20 to 0.20 m/s. The momentum of the body would

A. increase by 99kgm/s

B. decrease by 99kgm/s

C. increase by 101kgm/s

D. decrease by 101 kgm/s

Answer: B

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18. A bullet of mass 0.01 kg is fired from a gun weighing 5.0 kg. If the initial speed of the

bullet is 250 m/s, calculate the speed with which the gun recoils.

A. -0.50m/s

B. -0.25m/s

C. $+0.05$ m/s

D. $+0.25$ m/s

Answer: A

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19. A body of mass 100 g is moving with a velocity of 15 m/s. The momentum associated with the ball will be

A. 0.5 kg m/s

B. 1.5 kg m/s

C. 2.5 kg m/s

D. 3.2 Ns

Answer: B

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20. A number of discs, each of momentum M kg m/s ar striking a wall at the rate of n discs per minute. The force associates with these discs, in newotns, would be

A. $\frac{Mn}{60}$

B. $60Mn$

C. $\frac{M}{60n}$

D. $\frac{n}{60M}$

Answer: A

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21. When the momentum of a body a doubled, the kinetic energy is

A. halved

B. unchanged

C. doubled

D. becomes 4 times

Answer: D

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22. If action and reaction were to act on the same body

A. the resultant would be zero

B. the body would not move at all

C. both a and b are correct

D. neither a nor b is correct

Answer: C

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23. A stationary ball weighing 0.25 kg acquires a speed of 10m/s when hit by a hockey stick. The impulse imparted to the ball is

A. 2.5 Ns

B. 2.0 Ns

C. 1.5 Ns

D. 0.5 Ns

Answer: A

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24. A stone is tied to the middle of a string and suspended from one end as shown in fig. Here S is the stone and O is the point of suspension. If you give a sharp jerk at P, the

string will break.

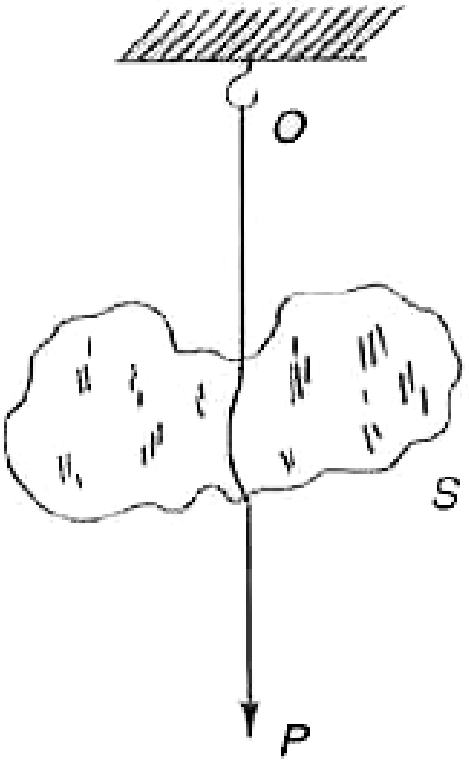

Fig. 3.3

A. below the stone

B. at the point P itself

C. from above the stone

D. nothing can be decided

Answer: A

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25. The combined effect of mass and velocity is taken into account by a physical quantity called

A. torque

B. moment of force

C. momentum

D. moment of momentum

Answer: C

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26. Momentum is a measure of

A. weight

B. mass

C. quantity of motion

D. velocity

Answer: C

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27. Momentum has the same units as that of

A. impulse

B. torque

C. moment of momentum

D. couple

Answer: A

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28. Consider two spring balances hooked as shwon in fig. We pull them in opposite directions. If the reading shwon by A is 1.5 N, the reading shownby B will be

Fig. 3.4

A. 1.5 N

B. 2.5 N

C. 3.0 N

D. zero

Answer: A

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29. A hammer weighing 3 kg, moving with a velocity of 10m/s, strikes against the hed of a spike and drives it into a block of wood. If the

hammer comes to rest in 0.025 s, the impulse associated with the ball will be

A. 30Ns

B. $-30Ns$

C. $15Ns$

D. $-15Ns$

Answer: B

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30. In a tug of war between the teams A and B, the rope breaks at a point whch is nearer to A. Then

A. A has applied more force

B. B has applied more force

C. A and B both have applied same force

D. neigher has applied any force

Answer: A

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31. A rocket works on the

A. first law of motion

B. second law of motion

C. third law of motion

D. law of conservation of energy

Answer: C

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32. A metalic ball strikes a wall and drops dead whereas rubber ball having the same mass and velocity bounces back. Which of the following is correct ?

A. both suffer equal change in momentum

B. the tennis ball suffers a greater change in momentum

C. metallic ball suffers a greater change in momentum

D. the momentum of the tennis ball is less than that of the metallic ball

Answer: B

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33. When a cicycle travels on a rough surface, its speed

A. increase

B. decreases

C. remains the same

D. None of these

Answer: B

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34. If you are asked to push an object so that the acceleration produced in it is now twice as before, then the force required will be

A. twice as before

B. half as before

C. same as before

D. four times as before

Answer: A

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35. It is difficult to walk on ice because of

A. absence of friction

B. absence of inertia

C. more inertia

D. more friction

Answer: A

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36. The law that defines force and inertia is

A. Newton's third law of motion

B. Newton's first law of motion

C. Newton's second law of motion

D. Newton's law of gravitation

Answer: B

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37. The law which gives a quantitative measurement of force is

A. Newto's third law of motion

B. Newton's first law of motion

C. Newton's second law of motion

D. Newton's law of gravitation

Answer: C

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38. Internal forces can change

A. are always balanced

B. are never balanced

C. may or may not be balanced

D. None of these

Answer: A

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39. External forces

A. are always balanced

B. never balanced

C. may or may not be balanced

D. None of these

Answer: C

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40. Friction between any two objects is due to

A. attraction between them

B. repulsion betweenn them

C. some adhesive forces between them

D. irregularities on the surfaces

Answer: D

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41. A and B are two objects with mass 6 kg and 34 kg respectively. Then

A. A has more inertia than B

B. B has more inertia than A

C. A and B both have same inertia

D. None of the above is true

Answer: B

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42. Which of the following class of forces is different from others?

A. Pulling of a cart

B. Stretching of a coiled spring

C. Kicking of a football

D. Electrical force

Answer: D

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43. Which of the following class of force is different from others?

A. Magnetic force

B. Electricial force

C. Gravitational force

D. Stretching of a spring

Answer: D

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44. A body is said to be under balanced forces when the resultat force acting on the body is

A. unity

B. zero

C. infinite

D. None of these

Answer: B

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45. P and Q are two objects with masses 5 kg and 30 kg respectively. Then

A. P has more inertia than Q

B. Q has move inertia than p

C. P and Q have the same inertia

D. neighter P nor Q has any inertia

Answer: B

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46. If $g = 10ms^{-2}$, what is the force of gravity acting on a mass of 1 kg?

A. 1N

B. 10N

C. $\frac{1}{10}N$

D. None of these

Answer: B

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47. What is the SI unit of force?

A. Dyne

B. Gram weight

C. Newoton

D. Kilogram weight

Answer: C

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48. 1dyne is equal to

A. 980 g wt

B. $\frac{1}{980}$ g wt

C. 980 kg wt

D. None of these

Answer: B

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49. When an object undergoes acceleration

A. its speed always increases

B. its velocity always increases

C. it always falls towards the earth

D. a force always acts on it

Answer: B

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50. A force acts on an object which is free to move. If we know the magnitude of the force and the mass of the object, newton's 2nd law of motion enable us to determine the object is

A. weight

B. speed

C. acceleration

D. position

Answer: C

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51. When 1 N force acts on 1 kg body that is able to move freely, the body receives

A. speed of $1ms^{-1}$

B. acceleration of $1ms^{-2}$

C. speed of $1kms^{-1}$

D. acceleration of $10ms^{-2}$

Answer: B

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52. When a net force acts on an object, the object will be accelerated in the direction of

the force with an acceleration proportional to the

A. force on the object

B. velocity of the object

C. mass of the object

D. inertia of the object

Answer: A

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53. Newton used the phrase quantity of motion for

A. momentum

B. force

C. acceleration due to gravity

D. None of these

Answer: A

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54. The effect of an impulse force on the body is measured only in terms of is

A. force on the object

B. moment of momentum

C. impulse

D. None of these

Answer: C

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55. kgms^{-1} is the SI unit of

A. impulse

B. force

C. angular velocity

D. None of these

Answer: A

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56. The gravitational unit of force in the metric system is

A. g wt

B. N

C. kgwt

D. None of these

Answer: C

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57. Galileo's law of inertia is another name for newton's (.....) law of motion.

A. first

B. second

C. third

D. anyone of the above

Answer: A

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58. Frictional force can't be measured in

A. kg wt

B. newton

C. dyne

D. $kgms^{-1}$

Answer: D

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59. Graphite powder is used in machines to

A. enhance friction

B. enchance profit

C. reduce friction

D. reduce efficiency

Answer: C

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60. Friction is a

A. self adjusting force

B. necessary evil

C. importat force in daily life

D. all the above

Answer: D

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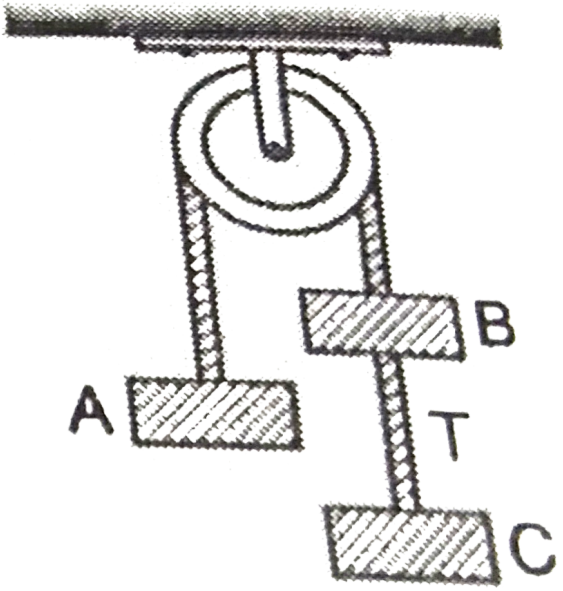
61. Three equal weights of mass 2 kg each are hanging on a string passing over a fixed pulley as shown in fig What is the tension in the string connecting weights B and C?



A. zero

B. 13N

C. 3.3N

D. 19.6N

Answer: B

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62. Two skaters A and B of mass 50 kg and 70 kg respectively stand facing each other 6 metres apart. They then pull on a light rope

stretched between them. How far each moved when they meet?

A. Both have moved 3 metres.

B. A moves 2.5 metres and B moves 3.5 metres.

C. A moves 3.5 metrs and B moves 2.5 metres.

D. A moves 2 metres and B moves 4 metres.

Answer: C

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63. A cannon after firing recoils due to

A. conservation of enerty

B. backward thrust of gases produced

C. Newton's 1st law of motion

D. Newton's 3rd law of motion

Answer: D

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64. A man of weight W is standing on a lift which is moving upward with an acceleration a. The apparent weight of the man is

A. $W\left(1+\frac{a}{g}\right)$

B. W

C. $W\left(1-\frac{a}{g}\right)$

D. $W\left(1-\frac{a^2}{g^2}\right)$

Answer: A

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65. You are on a frictionless horizontal plane. How can you get off if no horizontal force is exerted by pushing against the surface

A. By jumping

B. By spitting or sneezing

C. By rolling your body on the surface

D. By running on the plane

Answer: B

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66. A body of mass ma collides against a wall with the velocity v and rebounds with the same speed. Its magnitude of change of momentum is

A. zero

B. MV

C. 2MV

D. $-MV$

Answer: C

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67. A machine gun fires n bullets per second each of mass m . If the speed of each bullet is v, then the force of recoil is

A. mng

B. mnv

C. mnvg

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

Answer: B

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68. A bullet hits and gets embedded in a solid block resting on a frictionless surface. In this process, which of the following is correct ?

A. Momentum and kinetic energy

B. Momentum alone

C. Kinetic energ alone

D. Neigther momentum nor kinetic eergy

Answer: B

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69. A diwali rocket is ejecting $0.05kg$ of gases per second at a velocity of $400m/\sec$. The accelerating force on the rocket is

A. 20 dyne

B. 20 newton

C. 20 kg wt

D. sufficient data not given

Answer: B

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70. A person is sitting in a travelling train and facing the engine. He tosses up a coin and the coin falls behind him. It can be concluded that the train is

A. forward with uniform speed

B. backward with uniform speed

C. forward with acceleration

D. forward with deceleration

Answer: C

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71. A monkey is a reston a weightless rope which goes over a pulley and is tied to a bunch of bananas at the other end. The weight of the bunch of bananas isexactly the same as that of the monkey. The pulley is frictionless and weightless. The monkey starts to climb up the rope to reach the bananas. As he climbs, the

distance between him and the bananas will

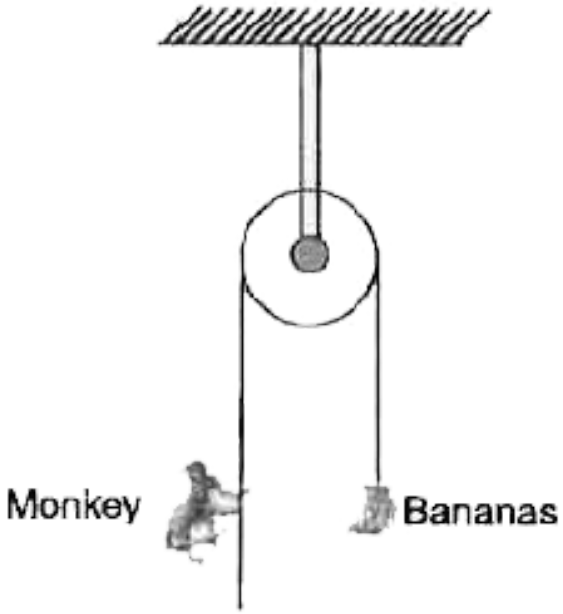

Fig. 3.6

A. decrease

B. increase

C. first decrease and then increase

D. remain unchanged.

Answer: D

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72. A stretching force of 100 N is applied at one end of a spring balance and an equal stretchign force is applied at the other end at the same time. The reading on the balance will be

A. 200 N

B. 100N

C. 400N

D. zero

Answer: B

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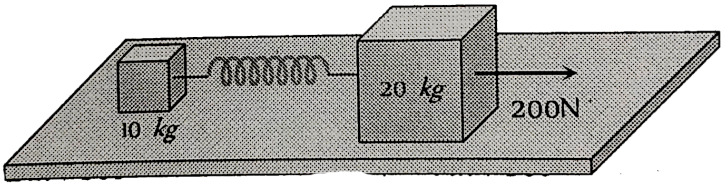
73. The masses of 10 kg and 20 kg respectively are connected by a massless spring as shown in figure. A force of 200 N acts on the 20 kg mass. At the instant shown, the 10 kg mass has acceleration $12m/\sec^2$. What is the

acceleration of 20 kg mass



A. $12ms^{-2}$

B. $4ms^{-2}$

C. $10ms^{-2}$

D. None of these

Answer: B

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74. If the mass of a body is 12.1 g and the density is 2.2 g/cc, its volume is

A. $5.5cm^3$

B. 8cc

C. 1cc

D. 55cc

Answer: A

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75. aluminium has a density of $2.7\frac{g}{}$ .the mass of 15 cc of aluminium is

A. 45 g

B. 40.5 g

C. 80 g

D. 100 g

Answer: B

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76. Brine has a density of 1.2 g/cc. 40 cc of it are mixed with 30 cc of water. The density of solution is

A. 2.11 g/cc

B. 1.11g/cc

C. 12.2g/cc

D. 20.4g/cc

Answer: B

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77. 60cc of a liquid of relative densilty 1.4 are mixed with 40 cc of another liquid of relative density 0.8. The density of the mixture is

A. 1.16 g/cc

B. 2.26 g/cc

C. 11.6 g/cc

D. 116.g/cc

Answer: A

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78. If a force of 10 N acts on surfaces of areas in the ratio $1:2$, then the ratio of thrusts is

A. $1:2$

B. $2:1$

C. $3:1$

D. $1:1$

Answer: D

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79. The height of mercury which exerts the same pressure as 20 cm of water column, is

A. 1.47 cm

B. 14.8cm

C. 148 cm

D. None of these

Answer: A

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80. The buoyant force depends on the

A. depth of a liquid

B. density of a liquid

C. colour of a liquid

D. None of these

Answer: B

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81. The hot air ballon rises because it is

A. denser

B. less dense

C. equally dense

D. the given statement is wrong

Answer: B

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82. A force of 50 N is applied on a nail of area 0.001 sq. cm. Then the thrust is

A. 50N

B. 100N

C. 0.05N

D. 10N

Answer: A

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83. A body floats with one-third of its volume outside water and $3/4$ of its volume outside another liquid. The density of another liquid is :

A. $\frac{3}{8}$ g/cc

B. $\frac{8}{3}$ g/cc

C. $\frac{9}{4}$ g/cc

D. $\frac{4}{9}$ g/cc

Answer: B

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84. A piece of wood floats in water. What happens to it in a alcohol?

A. Floats higher

B. Stays as before

C. Sinks

D. Sinks and rises

Answer: C

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85. A boat full of iron nails is floating on water in a lake. When the iron nails are removed the after level

A. rises

B. falls

C. remains the same

D. nothing can be said

Answer: B

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86. An ice cube is floating in a glass of water. What happens to the water level when the ice melts?

A. Rises

B. Falls

C. Remains same

D. First rises and then falls

Answer: C

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87. A solid weights 32 gf I air and 28.8 gf in water. The R.D. of the solid is

A. 8.9

B. 10

C. 29.12

D. 20

Answer: B

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88. A body of mass 50 kg has a volume $0.049m^3$. The buoyant force on it as

A. 50 kg f

B. 50 N

C. 49N

D. 49 kgf

Answer: D

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89. If the density of a metal is 8.2 g/cc, its relative density is

A. 8.2

B. $\frac{1}{8.2}$

C. 0.82

D. None of these

Answer: A

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90. SI unit of pressure is

A. atmosphere

B. dyne/cm^2

C. pascal

D. mm of Hg

Answer: C

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91. If two masses A and B have their masses in the ratio 1:4 and their volumes are equal, then the densities have the ratio

A. $1:4$

B. $4:1$

C. $2:1$

D. $3:1$

Answer: A

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92. The pressure exerted by a liquid of height h is given by(symbols have their usuall meanings)

A. $\frac{h}{dg}$

B. hdg

C. $\frac{h}{d}$

D. h g

Answer: B

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93. If the density of a block is 981 kg/m^3 then it shall

A. sink

B. float

C. float completely immersed in water

D. float completely out of water

Answer: B

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94. The R.D of a metal block is $2.7 \times 10^3 kg/m^3$. It is immersed in water. Then the block

A. sinks

B. flots

C. is partially immersed

D. has no part immersed

Answer: A

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95. As the density of a series of liquids increases, the upthrust on the iron rod submerged

A. increases

B. decreases

C. remains constant

D. nothing can be said

Answer: A

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96. A block of wood floats in water with $\frac{2}{3}$ of its volume submerged. Its relative density is

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

B. $\frac{2}{3}$

C. $\frac{4}{3}$

D. $\frac{1}{9}$

Answer: B

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97. The SI unit of thrust is

A. N

B. dyne

C. kg wt

D. Nm^{-2}

Answer: A

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98. Pressure cannot be measured in

A. Nm^{-2}

B. bar

C. Pascal

D. kgwt

Answer: D

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99. The total force exerted by the body perpendicular to the surface is called

A. pressure

B. thrust

C. impulse

D. None of these

Answer: B

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100. Pascal is the unit for

A. pressure

B. thrust

C. buoyant force

D. None of these

Answer: A

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101. At sea level, atmospheric pressure is

A. 76 cm, of Hg column

B. 76 m of Hg column

C. 0.76 cm of Hg column

D. 76 cm of water column

Answer: A

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102. 1 millibar is equal to

A. $100Nm^{-2}$

B. $100Nm^{-2}$

C. $1Nm^{-2}$

D. $\frac{1}{100} Nm^{-2}$

Answer: A

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103. Atmospheric pressure is measured by a

A. doctor's thermometer

B. speedometer

C. mercury barometer

D. None of these

Answer: C

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104. The mercury barometer was invented by

A. Celsius

B. Fahrenheit

C. Torricelli

D. Bernoulli

Answer: C

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105. The water forecasting departments uses- as the unit of pressure

A. bar

B. Nm^{-2}

C. Pa

D. mm of Hg

Answer: A

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106. The atmosphric pressure at the surface of the earth is about

A. $10^3 Nm^{-2}$

B. $10^5 Nm^{-2}$

C. $10^{-3} Nm^{-2}$

D. $10^{-5} Nm^{-2}$

Answer: B

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107. The SI unit of density is:

A. kgm^{-3}

B. gcm^{-3}

C. $kgwtcm^{-2}$

D. None of these

Answer: A

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108. Which of the following physical quantities has no unit?

A. Relative density

B. Density

C. Pressure

D. Thrust

Answer: A

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109. The ratio of SI units to CGS units of density is

A. 10^3

B. 10^2

C. 10^{-2}

D. 10^{-3}

Answer: D

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110. The density of water is

A. $10^{-3}kgm^{-3}$

B. $10^{-2}kgm^{-3}$

C. $10^{2}kgm^{-3}$

D. $10^{3}kgm^{-3}$

Answer: D

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111. Any solid will sink in water if its relative density is

A. less than unity

B. equal to unity

C. greater than unity

D. infinite

Answer: C

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112. Any solid will not sink in water if its relative density is

A. less than 1

B. equal to 1

C. greater than 1

D. infinite

Answer: A

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Higher Order Thinking Questions

1. A car travelling at a speed of 30 km/hour is brought to a halt in 8 m by applying brakes. If the same car is travelling at 60 km/hour, it can be brought to a halt with the same braking force in

A. 8 m

B. 16 m

C. 24 m

D. 32 m

Answer: D

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2. A body of mass 1 kg moving on a horizontal surface with an initial velocity of 6m/s comes to rest after 3 seconds. If one wants to keep the body moving on the same surface with the same velocity of 6m/s, then the force required is

A. zero

B. 2N

C. 4N

D. 8N

Answer: B

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3. The average force necessary to stop a hammer with 50 NS momentum in 0.05 s is

A. 50 N

B. 100 N

C. 500 N

D. 1000 N

Answer: D

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4. Two trains A and B are running in the same direction on the parallel rails such that A is faster than B. Packets of equal weight are

transfcrred from A to B. What will happen due to this :

A. P will be accelerated but Q will be retarded

B. P will be retarded but Q will be accelerated

C. There will be no change in velocity of P, but Q will be retarded

D. There will be no change in velocity of P, but Q will be accelerated

Answer: B

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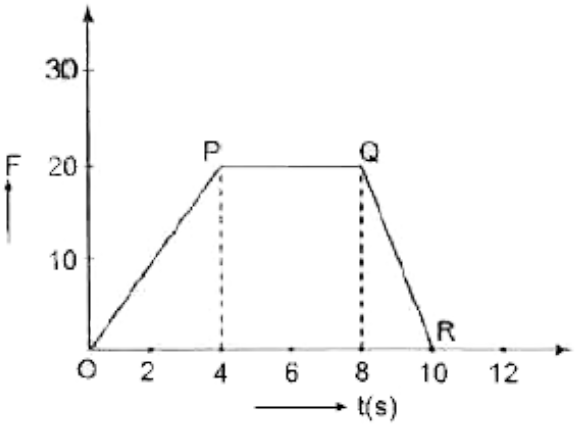
5. A body of mass 10 kg is acted upon by a net force F which varies with time t as shown in figure. Then the net momentum in SI units gained by the body at the end of 10 seconds is



A. 100

B. 120

C. 140

D. zero

Answer: C

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6. A machine gun has a mass 4 kg. It fires 50 gram bullets at the rate of 45 bullets per

minute at a speed of $400ms^{-1}$. What force is required to keep the gun in position ?

A. 5N

B. 10N

C. 20 N

D. 40 N

Answer: B

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7. A truck is loaded with 10^3 kg of iron and another identical truck is loaded with 10^3 kg of cotton. In case both the trucks are to go on the same rough road with the same speed, changes of overturning of

A. both the trucks are same

B. iron trucks a are more

C. coton trucks are more

D. nothing can be decided

Answer: C

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8. A particle of mass M strikes a wall at an angle of incidence 60° with velocity V elastically Then the change in momentum is

A. $\frac{MV}{2}$

B. MV

C. $-2MV$

D. zero

Answer: B

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9. The ratio of SI to cgs units of force is

A. 10

B. 10^2

C. 10^3

D. 10^5

Answer: D

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10. A metal ball and a rubber ball , both having the same mass , strike a wall normally with the same velocity. The rubber ball rebounds and the metal ball does not rebound. It can be concluded that

A. the mometum of rubber ball is greater than that of lead ball

B. the momentum of lead ball is greater than that of rubber ball

C. the rubber ball suffers a greater change in momentum as compared to lead ball

D. both the balls suffers an equal change in momentum

Answer: C

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11. A man of weight mg is moving up in a rocket with acceleration 4 g . The apparent weight of the man in the rocket is

A. 2Mg

B. 4Mg

C. 5Mg

D. zero

Answer: C

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12. A thief stole a box full of valuable articles of weight W and while carrying it on his back, he jumped down a wall of height ' h ' from the

ground. Before he reached the ground he experienced a load of

A. W

B. 2W

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

D. zero

Answer: D

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13. A bullet of mass m is fired at angle θ with the vertical. The bullet returns to the ground in time t. The total change of momentum equals

A. $\frac{mg}{t}$

B. $\frac{2mg}{t}$

C. mgt

D. $2mgt$

Answer: C

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14. A ballon has 2 g of air . A small hole is pierced into it . The air comes out with relative velocity 4 m/s . If the balloon shrinks completely in 2.5 s , the average force acting on the balloon is

A. 0.0032 N

B. 0.008 N

C. 3.2 N

D. 4.4 N

Answer: A

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15. A body of mass 2kg collides with a wall with speed 100 m/s and rebounds with same speed. If the time of contact was 1/50 second, the force exerted on the wall is

A. 4N

B. $8N$

C. $10^4 N$

D. $2 \times 10^4 N$

Answer: D

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16. In a rocket of mass 1000 kg fuel is consumed at a rate of 40 kg/s . The velocity of the gases ejected from the rocket is $5 \times 10^4 m/s$. The thrust on the rocket is

A. $2 \times 10^6 N$

B. $2 \times 10^4 N$

C. $2 \times 10^3 N$

D. zero

Answer: A

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17. Action and reaction

A. act on different objects

B. have opposite directions

C. have equal magnitude

D. have zero resultant

Answer: A::B::C

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18. A body is in translatory equilibium if:

A. resultant force on it is zero

B. it is at rest

C. it is in uniform motion

D. it is in accelerated motion

Answer: A::B::C

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19. If the tension in the cable supporting an elevator is equal to the weight of the elevator, the elevator may be :

A. going down with uniform speed

B. going up with uniform speed

C. going up with increasing speed

D. going down with increasing speed

Answer: A::B::C

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20. A scooter of mass 150 kg is moving with a uniform velocity of 108 km/h. Then the force required to stop he vehicle in 10s is

A. 360 N

B. 420 N

C. 450 N

D. None of these

Answer: C

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21. $Kgms^{-1}$ used to express

A. impulse

B. rate of change in momentum

C. pressure

D. None of these

Answer: A

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22. The area under the force time curve represents

A. force per unit time

B. average force

C. impulse

D. rate of change of momentum

Answer: C

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23. The buoyant force depends upon

A. density of the liquid

B. volume of the body inside the liquid

C. value of g at that place

D. all the above

Answer: D

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24. Buoyant force does not depend on

A. the density of the liquid

B. the density of the body

C. total volume of the body

D. shape of the body

Answer: B::C::D

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25. Two stretched membranes of areas $2cm^2$ and $3cm^2$ are placed in a liquid at the same depth. The ratio of the pressures on them is:

A. $1:1$

B. $2:3$

C. $\sqrt{2}:\sqrt{3}$

D. nothing can be decided

Answer: A

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26. A boy is carrying a bucket of water in one hand and a piece of plastic in the other. After transferring the plastic piece to the bucket (in which it floats the boy will carry :

A. same loads as before

B. less load as before

C. more load as before

D. either less or more load depending on the density of the plaster.

Answer: A

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27. A raft of wood (density $= 600kg/m^3$) of mass $120kg$ floats in water. How much weight can be put on the raft to make it just sink?

A. 40 kg

B. 80 kg

C. 160 kg

D. 240 kg

Answer: B

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28. A wooden cube floating in water supports a mass 0.2 kg on its top. When the mass is removed the cube rises by 2cm. What is the

side legnth of the cube ? Density of water $= 10^3 kg/m^3$

A. 25 cm

B. 15 cm

C. 10 cm

D. 5 cm

Answer: C

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29. A boat having a length of 3 m and breadth of 2 m is floating on a lake. The boat sinks by 1 cm when a man gets on it. The mass of the mas is:

A. 60 kg

B. 120 kg

C. 140 kg

D. None of these

Answer: A

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30. A man is sitting in a boat which is floating in a pond.If the man drinks some water from the pond ,the level of water in the pond

A. decreases

B. increases

C. remains unchanged

D. nothing can be decided

Answer: C

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31. A body partly immersed, floats in a liquid concentained in a beaker. The beaker is kept inside a lift falling freely under gravity. The upthrust on the body due to liquid is

A. zero

B. equal to weight of body in air

C. equal to weight of liquid displaced

D. equal to weight of immersed part of body

Answer: A

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32. The fraction of a floating object of volume V_0 and density d_0 above the surface of a liquid of density d will be

A. $\frac{d}{d_0}$

B. $\frac{d_0}{d}$

C. $\frac{d - d_0}{d}$

D. $\frac{d_0}{d - d_0}$

Answer: C

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33. The most characteristic property of a liquid is

A. elasticity

B. fluidity

C. formlessness

D. volume conservation

Answer: D

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34. A weightless bag is filled with 10 kg of water and then weighed in water. The reading of the spring balance is

A. 10 kg wt

B. 5 kg wt

C. 1.6 kg wt

D. zero

Answer: D

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