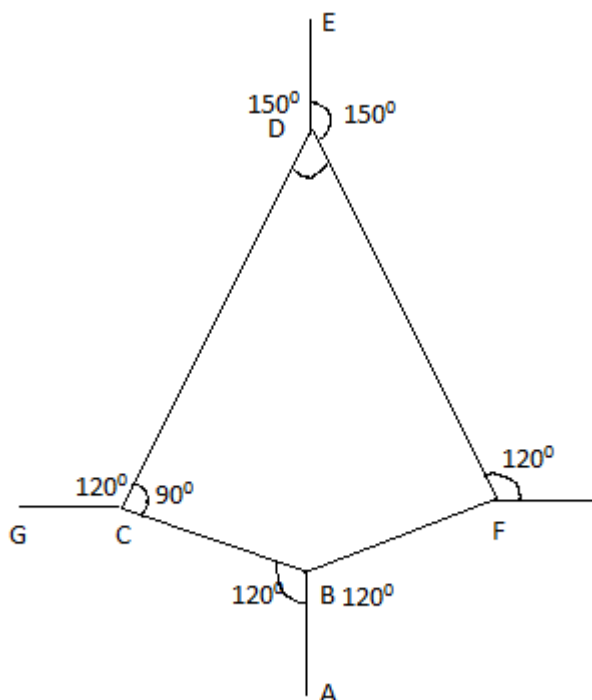1. Two bodies of masses 1 and 2 kg have equal momentum. The ratio of their kinetic energies is

(a) 1 : 3   (b) 1 : 1   (c) 2 : 1   (d) 3 : 1

2.   The adjacent figure is a part of horizontally stretched net. The tension in the part AB is 10 N. What are the tensions in BC and BF?

(a) 10 N, 11 N   (b) 10 N, 6 N   (c) 10 N, 10 N   (d) can't calculate

3. A student unable to answer a question on Newton's Laws of Motion, attempts to pull himself up by tugging his hair. He will not succeed

(a) As the force exerted is small

(b) As the frictional force while gripping is small

(c) Newton's law of inertia is not applicable for human beings

(d) As the force applied is internal to the system

4. A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2 : 3. The smaller fragment moves with a velocity of 6 m/s. The kinetic energy of the larger fragment is

(a) 360 J   (b) 144 J   (c) 216 J   (d) 96 J

5. A mass of 10 kg is suspended by a spring balance. It is pulled aside by a horizontal string so that it makes an angle of 60^0 with the vertical. The new reading of the balance is

(a) 20 kg.wt   (b) 10 kg.wt   (c) $10\sqrt{3}$ kg.wt   (d) $20\sqrt{3}$ kg.wt

6. A body of mass 4 kg is accelerated by a constant force and it travels a distance of 5 m in the first second and 2 m in the third second. The force acting on the body is

(a) 2 N   (b) 4 N   (c) 6 N   (d) 8 N

7. A body of mass 0.05 kg is found to fall with an acceleration of 9.5 ms^{-2}. The opposing force of air on the body is (g = 9.8 ms^{-2})

(a) 0.15 N   (b) 0.03 N   (c) zero   (d) 0.015 N

8. Three concurrent coplanar forces 1, 2 and 3 N are acting in different directions on a body.

(a) They can keep the body in equilibrium if 1 and 2 N act at right angles

(b) They can't keep the body in equilibrium

(c) They can keep the body in equilibrium if 1 and 3 N act at an acute angle

(d) They can keep the body in equilibrium if 2 and 3 act at right angles
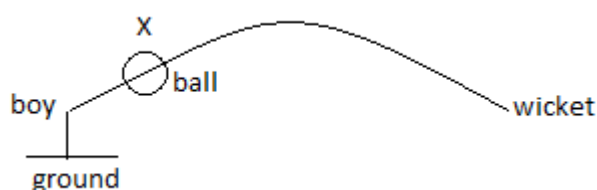
9. A boy throws a cricket ball from the boundary towards the wicket. If the frictional force due to the air can't be ignored, the forces acting on the ball at the position X are represented by

10. If the linear momentu of a body increases by 50 %, then the kinetic energy increases by

(a) 225 %   (b) 25 %   (c) 100 %   (d) 125 %
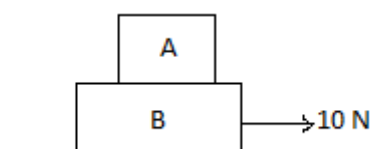
11. A block A of mass 2 kg is placed over block B of mass 8 kg. The combination is placed over a rough horizontal surface. Coefficient of friciton between B and the floor is 0.5 and between A and B is 0.4. A horizontal force of 10 N is applied on B as shown. The force of friciton between A and B is

(a) 100 N   (b) 40 N   (c) 50 N   (d) zero

12. A body of mass m is travelling with a velocity u. A constant retarding force F acts on it and it comes to rest travelling a distance s$_1$. If the initial velocity is 2u, and the same force is applied, the distance travelled before coming to rest is s$_2$

(a) $s_2 = 2s_1$ (b) $s_2 = \dfrac{s_1}{2}$ (c) $s_2 = s_1$ (d) $s_2 = 4s_1$

13. A block is kept on a rough surface and the block starts sliding when the inclination of the surface is θ with the horizontal. The coefficient of static friction between the block and the surface is
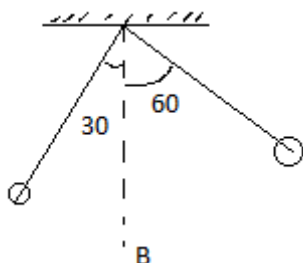
(a) sinθ   (b) cosθ   (c) tanθ   (d) secθ

14. A lift is moving up with an acceleration of 5 ms^{-2} and a ball is dropped from a height of 1.25 m inside it. The time taken by the ball to reach the floor of the lift is (g = 10 ms^{-2})

(a) 0.3 s   (b) 0.2 s   (c) 0.16 s   (d) 0.4 s

15. A gun fires a small bullet with a kinetic energy K. The kinetic energy of the gun during recoil is

(a) K   (b) more than K   (c) less than K   (d) $\sqrt{K}$

16.   From a fixed support two identical spheres are suspended by strings of length 1 m each. They are pulled aside as shown and released. B is the mean position. The two will collide

(a) At B after 2.5 s   (b) at B after 0.5 s

(c) On the right side of B after some time

(d) On the right side of B when the strings are inclined at 15^0 with B

17. A person is driivng a vehicle with a uniform speed of 5 m/s on a horizontal curved road of radius 5 m. The coefficent of static friciton between the road and the tyres is 0.1. Will the person slip while taking a turn with that speed? Take g = 10 ms^{-2}

(a) He will slip if $v^2 = 5ms^{-1}$ (b) He will slip if $v^2 > 5ms^{-1}$

(c) He will slip if $v^2 < 5ms^{-1}$ (d) He will not slip if $v^2 > 10ms^{-1}$

18. AN aeroplane executes a horizontal loop at a speed of 720 kmph with its wings banked at 45^0. What is the radius of the loop? Take g = 10 ms^{-2}

(a) 4 km   (b) 4.5 km   (c) 7.2 km   (d) 2 km

19. Ratio of angular speed of a second-hand to hour-hand of a watch is

(a) 60 : 1   (b) 72 : 1   (c) 720 : 1   (d) 3600 : 1

20. The kinetic energy of a body of mass 4 kg and momentum 6 Ns will be

(a) 3.5 J   (b) 5.5 J   (c) 2.5 J   (d) 4.5 J

21. A stone of mass 0.05 kg is thrown vertically upwards. What is the direction and magnitude of the net force on the stone during its upward motion?

(a) 0.49 N vertically upwards

(b) 0.49 N vertically downwards

(c) 9.8 N vertically downwards

(d) 0.98 N vertically downwards