

# Force and perfectly elastic question essay sample



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Question no 9) A package is dropped from a helicopter moving upward at 15m/s. If it takes 16 sec before the package strikes the ground, how high above the ground was the package when it was released if air resistance is negligible? Ans) 1000m

Question no. 11) If  $A \cdot B = 0$ , then the vectors A and B have equal magnitudes and are directed in the opposite directions from each other. Ans) False

Question no. 16) A monkey is sitting at the top of a tree 20 m above ground level. A person standing on the ground wants to feed the monkey. He uses a bow and arrow to launch the food to the monkey. If the person knows that the monkey is going to drop from the tree at the same instant that the person launches the food, how should the person aim the arrow containing the food? Air resistance is small enough to be ignored. Ans) He should aim it at the monkey.

Question no 18) An object has a position given by  $r = [2.0 \text{ m} + (5.00 \text{ m/s})t]i + [3.0 \text{ m} - (2.00 \text{ m/s}^2)t^2]j$ , where quantities are in SI units. What is the speed of the object at time  $t = 2 \text{ sec}$ ? Ans) 9.43m/s

Test 2:

Question no 16) In order to lift a bucket of concrete, you must pull up harder on the bucket than it pulls down on you. Ans) False

Question no 17) Two weights are connected by a massless wire and pulled upward with a constant speed of 1.50 m/s by a vertical pull P. The tension in the wire is T (see figure). Which one of the following relationships between T and P must be true? Ans)  $P = T + 25 \text{ N}$  UNIT IS Newton(N)

Question no 22) If you swing a bucket of water fast enough in a vertical circle, at the highest point the water does not spill out because an outward force balances the pull of gravity on the water. Ans) False

Question no 23) Suppose a highway curve is properly banked to eliminate friction for a speed of 45 mph. If your tires were bald and you wanted to avoid sliding on the road, you would have to drive Ans) at exactly 45mph

question no 25) A 23 kg mass is connected to a nail on a frictionless table by a massless string 1.3 m long. There is no appreciable friction between the nail and the string. If the tension in the string is 51 N while the mass moves in a uniform circle on the table, how long does it take for the mass to make one complete revolution? Ans) 4.8 seconds

Question no 4) A man is straining to lift a large crate, without success because it is too heavy. We denote the forces on the crate as follows: P is the upward force the man exerts on the crate, C is the vertical contact force exerted on the crate by the floor, and W is the weight of the crate. How are the magnitudes of these forces related while the man is trying unsuccessfully to lift the crate? Ans)  $P + C = W$  unit of force is Newton(N)

Test 3:

Question no. 5) Jacques and George meet in the middle of a lake while paddling in their canoes. They come to a complete stop and talk for a while. When they are ready to leave, Jacques pushes George's canoe with a force F to separate the two canoes. What is correct to say about the final momentum and kinetic energy of the system if we can neglect any

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resistance due to the water? The final momentum is in the direction opposite to  $F$  but the final kinetic energy is zero. Question no. 10) A person pushes horizontally on a heavy box and slides it across the level floor at constant velocity. The person pushes with a  $60.0 \text{ N}$  force for the first  $6.88 \text{ m}$  at which time he begins to tire. The force he exerts then starts to decrease linearly from  $60.0 \text{ N}$  to  $0.00 \text{ N}$  across the remaining  $6.88 \text{ m}$ . How much total work did the person do on the box?  $619 \text{ J}$  (Joules)

Question no 12) In the figure, determine the character of the collision. The masses of the blocks, and the velocities before and after are given. The collision is

Ans) Perfectly Elastic

Question no 17) On a frictionless horizontal table, two blocks (A of mass  $2.00 \text{ kg}$  and B of mass  $3.00 \text{ kg}$ ) are pressed together against an ideal massless spring that stores  $75.0 \text{ J}$  of elastic potential energy. The blocks are not attached to the spring and are free to move free of it once they are released from rest. The maximum speed achieved by each block is closest to:

Ans)  $6.71 \text{ m/s}$  (A),  $4.47 \text{ m/s}$  (B)

Question no 18) A box of mass  $m$  is pressed against (but is not attached to) an ideal spring of force constant  $k$  and negligible mass, compressing the spring a distance  $x$ . After it is released, the box slides up a frictionless incline as shown in the figure and eventually stops. If we repeat this experiment but instead compress the spring a distance of  $2x$

Ans) just as it moves free of the spring, the box will be traveling twice as fast as before.