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University of Physics, 13e (Young/Friedman) Chapter 4 Newtons Laws of Motion 4.1 Conceptual questions 1) You swing the bat and hit a heavy box with a force of 1500 N. Force, which the box exerts on the bat A) exactly 1500 N just in case the box does not move. B) exactly 1500 N regardless of whether the box moves or not. C) more than 1500 N if the box moves. D) Less than 1500 N if the box moves. E) more than 1500 N if the bat bounces back. Answer: B Var: 1 2) Point P in the picture indicates the position of an object traveling at a constant clockwise speed around the circle. Which arrow is best represented by the direction of movement of the object, if the pure external force on it is suddenly reduced to zero? A) B) C) D) Answer: D Var: 1 3) The object moves to the right, and experiences pure force that is directed to the right. The scale of power decreases over time. Object A) is increasing. B) decreases. C) constant in time. Answer: Var: 1 4) A stalled car is being pushed up the hill at constant speed by three people. Net power on car A) is zero. B) up the hill and equal to the weight of the car. C) down the hill and equal to the weight of the car. D) Up the hill and more than the weight of the car. E) down the hill and more than the weight of the car. Answer: Var: 1 5) In order to get the object moving, you have to push harder on it than it pushes back at you. A) True B) False answer: B Var: 1 6) In order to lift a bucket of concrete, you have to pull up harder on the bucket than it pulls down on you. A) True B) False answer: B Var: 1 7) The car is towed at a constant speed on a horizontal road using a horizontal circuit. The tension in the chain should be equal to the weight of the car to maintain a constant speed. A) True B) False answer: B Var: 1 8) The M mass box is stretched with constant acceleration on the horizontal non-frictionless semi by a wire that makes the angle 15 above the horizontal. If T is the voltage in this wire, then A) T and ma. B) T/gt, ma, C) T zlt; ma. Answer: B Var: 1 9) You stand in a moving bus, face forward and you suddenly fall forward as the bus comes to an immediate stop. The force acting on you, which makes you fall forward, is A) gravity. B) Normal strength due to your contact with the floor of the bus. C) Strength due to static friction between you and the floor of the bus. D) strength due to kinetic friction between you and the floor of the bus. E) No force acted on you to make you fall. Answer: E Var: 1 10) Think about what happens when you jump into the air. Which of the following is the most accurate statement? A) It is a rising force rendered by the earth that pushes you upwards, but this force cannot exceed your weight. B) You may arise because the earth exerts force up on you, which is more than the downward force you exert on the earth. C) Because the earth is stationary, it cannot the per ascending power needed for into the air. Instead, it is the inner strength of your muscles acting on the body itself that pushes your body into the air. D) When you push down to the ground with force greater than your weight, the earth will push back with the same magnitude force and thus propel you into the air. E) When you jump up the ground has the power of F1 on you and you are having the power of F2 on the ground. You're going up because F1 is f--ing F2. Answer: D Var: 1 11) A 20-ton truck collides with a 1,500-pound car and causes a lot of damage to the car. In a collision A) the force on the truck due to the collision is slightly more than the force on the car. B) The force on the truck due to the collision is exactly equal to the force on the car. C) The force on the car due to the collision is much more than the force on the truck. D) The car and the truck have the same speed. Answer: B Var: 1 12) Two objects, each weighing W, hang vertically with spring scales, as shown in the picture. The squits and strings attached to the objects have a slight weight, and there is no noticeable friction in the pulleys. Reading in each scale A) W. B) is more than W, but not quite twice as much. C) Less than W. D) 2W. E) more than 2W. Answer: Var: 1 13) Fish weighing 16 N is weighed using two spring scales, each of insignificant weights, as shown in the picture. What will the weight readings be? A) The lower scale will read 16 N, and the top scale will read zero. B) Each scale will read 16 N. C) The top scale will read 16 N, and the lower scale will read zero. D) The scales will have different readings, but the sum of the two readings will be 16 N. E) Each scale will read 8 N. Answer: B Var: 1 14) The object moves forward at a constant speed. What statement about this object should be true? A) The net strength of an object is zero. B) The net strength of the object is in the direction of forward. C) No force acts on the object. D) Accelerating the object is in the right direction. Answer: Var: 1 15) Suppose you play ice hockey on a new age ice, for which there is no friction between ice and hockey puck. You wind up and hit the puck as hard as you can. After the puck loses contact with the stick, puck A) begins to slow down. B) do not slow down and do not accelerate. C) speed up a bit and then slow down. D) speed up a bit and then move at a constant speed. Answer: B Var: 1 16) The ball is tossed vertically up. When it reaches its highest point (before falling down) A) the speed is zero, the acceleration is directed downwards, and the gravity acting on the ball is directed downwards. B) The speed is zero, the acceleration is zero, and the gravity acting on the ball is zero. C) The speed is zero, the acceleration is zero, and the gravity of the ball is directed downwards. D) Speed and acceleration in reverse direction, but gravity on the ball remains E) Speed, acceleration and gravity on the ball are all in the opposite direction. Answer: Var: 1 17) The dog stands in the bed of the pickup truck. The bed is covered with ice, causing the friction between the dog and the truck to be zero. The truck is first at rest, and then accelerates to the right, moving on a flat road. As can be seen from the stationary observer (watching as the truck moves to the right), dog A) does not move left or right, but the back of the truck moves towards the dog. B) moves to the right, but not as fast as the truck moves to the right, causing it to slide towards the back of the truck. C) moves to the right at the same speed as the truck, so it does not slide. D) moves to the left as the truck moves to the right, causing the dog to slide towards the back of the truck. Answer: Var: 1 18) You sit on the bus and notice that the hand strap that hangs from the ceiling hangs from the vertical in the opposite direction. From this observation we can conclude that A) the speed of the bus forward. B) The speed of the bus is backward. C) You can't conclude anything about the direction of the bus speed. Answer: C Var: 1 4.2 Problems 1) The block lies on a horizontal surface without friction. The block is applied to the horizontal force of 100 H, which allows to accelerate to 3.0 m/s². (a) Determine the mass of the block. (b) Calculate the distance that the unit will travel if the force is applied within 10 s. (c) Calculate the speed of the unit after the use of force for 10 s. Answer: a) 33 kg (b) 150 m (c) 30 m/s Var: 1 2) If the box weighing 5.0 kg is stretched simultaneously by a force of 10.0 H and force 5.0 H, its acceleration should be A) 3.0 m/s². B) 2.2 m/s². C) 1.0 m/s². D) We cannot say on this information. Answer: D Var: 1 3) The picture shows a graph of acceleration against force for three objects stretched by rubber bands. The mass of object 2 is 36 kg. A) 14 kg and 90 kg B) 72 kg and 18 kg C) 90 kg and 18 kg D) 14 kg and 72 kg Answer: A Var: 50 4) 7.0-kg object operates by two forces. One of the forces is 10.0 N, acting in the direction of the east. Which of the following forces is another force if the acceleration of the object is 1.0 m/s² to the east? A) 6.0 N East B) 3.0 N West C) 12 N East D) 9.0 N West E) 7.0 N West Answer: B Var: 1 5) Next 4 efforts to operate on a 4.00 kg facility: 1 y 300 N east 2 700 N north 3 y 500 N west 4 and 600 N south What is the acceleration of the facility? A) 224 N towards 63.4 north of West B) 300 N towards 63.4 north of West C) 300 N towards 26.6 north of West D) 224 N towards 26.6 North of the west E) 2100 N towards 26.6 north of the west Answer: D Var: 1 6) The International Space Station has a mass of 1.8 10⁵ kg. 70.0-kilogram astronaut inside the station is repelled from one wall of the station, therefore accelerates from 1.50 m/s². What is the magnitude of the acceleration space station as the astronaut pushes off the wall? Give your answer to the observer who is in space on foot and therefore does not accelerate with the space station because of the jolt. A) 5.8 10⁻⁴ m/s² B) 1.50 m/s² C) 4.7 10⁻⁴ m/s² D) zero E) 3.9 10⁻³ m/s² Answer: Var: 1 7) On the horizontal floor without friction, the 0.900 kN pushes horizontally with a force of 200 kN per box weighing 1.80 kN. As a result of this push, what statement can be true? A) The box will not move because the push is less than its weight. B) The worker and the box will have an acceleration of 1.08 m/s², but in opposite directions. C) The working and the box will have an acceleration of 2.17 m/s², but in opposite directions. D) The worker accelerates from 1.08 m/s², and the box accelerates from 2.17 m/s², but in opposite directions. E) The worker accelerates from 2.17 m/s², and the box accelerates from 1.08 m/s², but in opposite directions. Answer: E Var: 1 8) Box 50.0-N glides over a rough horizontal floor, and the only horizontal force acting on it is friction. You note that in an instant the box slides to the right at a speed of 1.75 m/s and stops at 2.25 with a homogeneous acceleration. What is the magnitude of friction on this box? A) 3.97 N B) 8.93 N C) 38.9 N D) 50.0 N E) 490 N Answer: A Var: 1 9) The block is on a frictionless horizontal table, on the ground. This block accelerates at a speed of 1.9 m/s², when it is applied horizontal force 90 N. Block and the table is installed on the Moon, where acceleration due to gravity is 1.62 m/s². What is the weight of a block on the moon? A) 77 N B) 67 N C) 58 N D) 48 N E) 39 N Answer: Var: 50 10) The unit is on a frictionless horizontal table, on the ground. This block accelerates at a speed of 3.6 m/s², when it is applied horizontal force 90 N. Block and the table is installed on the Moon, where acceleration due to gravity is 1.62 m/s². The horizontal force of 45 N is applied to the block when it is on the moon. What acceleration does this force give to the block? A) 1.8 m/s² B) 1.6 m/s² C) 2.0 m/s² D) 2.2 m/s² E) 2.3 m/s. Answer: Var: 50 11) 1100-kilogram car, driving at a speed of 27.0 m/s, begins to slow down and stops at a speed of 578 m. What is the average braking force acting on the car? A) 690 N B) 550 N C) 410 N D) 340 N Answer: Var: 1 12) On its own, a certain tow truck has a maximum acceleration of 3.0 m/s². What would be the maximum acceleration when this truck towing a bus twice its weight? A) 2.5 m/s² B) 2.0 m/s² C) 1.5 m/s² D) 1.0 m/s² Answer: D Var: 1 13) In the ballistics test, a bullet weighing 1.50g of shots through a 28.0kg block moves horizontally to the pool. In this test, the bullet takes 11.4ms to pass through the block as it changes the speed of the blocks from 1.75 m/s on the right to 1.20 m/s left with constant acceleration. Find the magnitude of the force the bullet exerts on the block during this ballistic test. Answer: 103 N Var: 1 14) The 10,000 kg rocket takes off from the ground at an even upward speed of 2.00 m/s² and does not feel air resistance. The rising traction that the engines must provide during this acceleration is closest to A) 20,000 N. B) 980,000 N. C) 118,000 N. D) 78,000 N. Answer: C Var: 1 15) Car bumpers have little use in collision. To understand why, calculate the average strength a bumper would have to attach if it brought a 1,200-kilogram car (the so-called compact model) to rest at 15 cm when the car had an initial speed of 2.0 m/s (about 4.5 mph). (Bumpers are built with springs that are compressed to provide a power stop without, hopefully, a dent in metal.) A) 1.8 10⁴ N B) 1.6 10⁴ N C) 5.4 10⁴ N D) 6.5 10⁵ N E) 3.2 10⁴ N Answer: B Var: 1 16) A 50 kg mass box is at rest on a horizontal surface without friction. Permanent horizontal force F then acts on the box and accelerates it to the right. It is noted that it takes 6.9 seconds for the box to move 28 meters. What is the magnitude of strength? Answer: 59 N Var: 50 17) The locomotive pulls 19 freight cars, each loaded with the same amount of weight. If the train accelerates at a speed of 0.22 m/s² at the track level, what is the tension between the second and third carriages? (The nearest car to the locomotive is considered to be the first car, and friction is insignificant.) Answer: 140,000 N Var: 50 x 18) 1000-kilogram car drives north on a straight horizontal road at a speed of 20.0 m/s. The driver applies the brakes and the car comes to rest evenly at a distance of 200 m. What is the scale and direction of pure force applied to the car to bring it to rest? A) 1.00 N north B) 10.0 103 N south C) 1.00 103 N south D) 1.00 N south E) 100 N south answer: C Var: 5 19) Builder pulls a box of instruments on an even horizontal floor with a force of 100 N in the direction of 37.0 over the horizon. The weight of the box and tools is 40.0 kg. a) Draw a free body diagram for the box. (b) Calculate the acceleration of the box. c) How hard does the floor push up the box? Answer: (a) The box acts with gravity, which points down to the center of the earth. The normal force is directed towards the box perpendicular to the floor surface. The force of the pull is directed from the box at an angle of 37.0 degrees above the horizontal. (b) 2.00 m/s² (c) 332 N Var: 1 20) A series of weights connected by very light cords, given an upward acceleration of 4.00 m/s² to pull P, as shown in the figure. A, B and C are voltages in the connecting cords. SMALLEST of three tensions, A, B, C, closest to A) 80.0 N. B) 196 N. C) 276 N. D) 483 N. E) 621 N. Answer: C Var: 1 22) The figure shows the acceleration chart of the 125th object as a function of pure force acting on it. Answer: A: 16 m/s², B: 4.0 m/s² Var: 1 23) The graph shows the acceleration graph of the object as a function of pure force acting on it. B) 11. C) 89. D) 8000. Answer: Var: 1 24) Two forces are active on a 55-kilogram object. One force has a magnitude of 65 N, directed 59 clockwise from the positive x-axis, and the other has a magnitude of 35 N at 32 clockwise from the positive axis. What is the magnitude of the acceleration of these objects? A) 1.1 m/s² B) 1.3 m/s² C) 1.5 m/s² D) 1.7 m/s² Answer: Var: 46 25) The graph in the picture shows the x component acceleration of the 2.4-kg object as a time function (in ms). (a) At what time x the pure force component on the object reaches its maximum value, and what is the maximum value? (b) What is the x-component of pure force on an object at a time of 10.0 ms and at 4.0 ms? Answer: (a) At 3.0ms, 48 N (b) 12 N, -24 N Var: 1 26) The figure shows the net force acting on a 3.0-kilogram object depending on the time. (a) What is the acceleration of this object in time t 2.0 s? (b) Draw to scale, the acceleration graph of this object as a time function in the range of 0.00 s to 17.0 s. Answer: (a) 2.0 m/s² (b) The acceleration time graph looks just like the time chart, except for the vertical axis, the numbers (starting with 2.0) are replaced by 0.67, 1.3, 2.0, 2.7, 3.3 and 4.0. Var: 1 Once the order is placed, the order will be delivered to your email in less than 24 hours, mostly within 4 hours. Hours. sears zemansky 13 edicion. sears zemansky 13 ed pdf. sears zemansky 13 ed vol 1. sears zemansky 13 ed solucionario. sears zemansky 13 edicion volumen 1 pdf. sears zemansky 13 edicion volumen 2. sears zemansky 13 edicion volumen 2 pdf

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