1) A 10-kg sign is held by two ropes as shown in Figure above. What is the tension on rope A?
A) 69 N
B) 72 N
C) 88 N
D) 98 N
Answer: C

2) Refer to Figure above. Block A has a mass of 2.60 kg and rests on a smooth table and is connected to block B, which has a mass of 2.40 kg, after passing over an ideal pulley, as shown. Block B is released from rest. What is the acceleration of the masses?
A) 3.92 m/s²
B) 5.10 m/s²
C) 4.71 m/s²
D) 6.54 m/s²
Answer: C

3) Refer to Figure above. Block A has a mass of 3.00 kg, block B has a mass of 5.00 kg and block C has a mass of 2.00 kg. The pulleys are ideal and there is no friction between block B and the table. What is the acceleration of the masses?
A) 0.981 m/s²
B) 1.86 m/s²
C) 2.94 m/s²
D) 4.20 m/s²
Answer: A

4) When you try to bring a car to a stop over the shortest possible distance, it is better
A) to lock the wheels and "burn rubber" while the car slides.
B) to keep the wheels turning by continuously pumping the brake pedal.
C) to floor the brake pedal and help even more by using the hand brake.
D) none of the above
Answer: B

5) Compare the two situations shown in the figure below. On the left (A), James is holding the rope and keeping the bucket at rest. On the right (B), James ties the rope to the bucket so that it keeps the bucket at rest. In both cases the bucket contains the same quantity of water.

In what case is the tension in the rope lower?
A) right
B) left
C) It is the same in both cases.
D) Need more data to answer
Answer: A

6) In the figure below, the block of mass $m$ is at rest on an inclined plane that makes an angle $\theta$ with the horizontal.

The force of static friction $f$ must be such that
A) $f > mg$
B) $f > mg \cos \theta$
C) $f = mg \cos \theta$
D) $f = mg \sin \theta$
Answer: D

7) What average net force is required to accelerate a car with a mass of 1200 kg from 0 to 27.0 m/s in 10.0 s?
A) 444 N
B) 3240 N
C) 4360 N
D) 11800 N
Answer: B

8) A catcher stops a ball traveling at 40 m/s in a distance of 20 cm and feels a force of 600 N against his glove. What is the mass of the ball?
A) 0.15 kg
B) 0.20 kg
C) 0.25 kg
D) 0.30 kg
E) 0.45 kg
Answer: A

9) A 1000-kg barge is being towed by means of two horizontal cables. One cable is pulling with a force of 80.0 N in a direction 30.0° west of north. The second cable pulls in a direction 20.0° east of north. What
should the magnitude of its pulling force be so that the barge will accelerate northward?
A) 127 N  
B) 120 N  
C) 117 N  
D) 73.7 N  
E) 150.7 N  
Answer: C

10) An astronaut weighs 99.0 N on the Moon, where the acceleration of gravity is 1.62 m/s². How much does she weigh on Earth?
A) 61.0 N  
B) 99.0 N  
C) 600 N  
D) 440 N  
E) 1200 N  
Answer: C

11) An object is being acted upon by three forces and moves with a constant velocity. One force is 60 N along the x-axis, the second is 75 N along the y-axis. What is the direction of the third force, measured counterclockwise from the x-axis?
A) 128°  
B) 182°  
C) 213°  
D) 231°  
E) 29°  
Answer: D

12) A 3.0-kg and a 5.0-kg box rest side-by-side on a smooth, level floor. A horizontal force of 32 N is applied to the 3.0-kg box pushing it against the 5.0-kg box, and, as a result, both boxes slide along the floor. How large is the contact force between the two boxes?
A) 12 N  
B) 20 N  
C) 32 N  
D) 0 N  
E) 50 N  
Answer: B