Problem set to be solved in class 16 of December

Problem 2.1

A ball of mass m =1 kg , suspended by a string, hangs at rest in an elevator. Draw the diagram of applied forces for the ball and create the corresponding table of forces. Find the tension force magnitude if the elevator starts to move upward with acceleration of 2 m/s^2. Do the same for the elevator accelerating downwards.

Problem 2.2

A wooden block of mass m =2kg is sliding down a flat metal incline (a flat metal ramp) that makes an angle q =45º with the horizontal. The block is slowing down. Draw the diagram of forces applied to the block. Find the acceleration of the block. Do the same for the case when the surface is not frictionless but has friction constant equal to 0.2.

Problem 2.3:

A cart of mass m_C =2 kg is on a horizontal frictionless track. One end of an ideal massless string segment is attached to the middle of the front end of the cart. From there the string extends horizontally, forward and away from the cart, parallel to the centerline of the track, to a vertical pulley. The string passes over the pulley and extends downward to a solid metal block of mass m_B =1 kg. The string is attached to the block. A person was holding the cart in place. The block was suspended at rest, well above the floor, by the string. The person has released the cart. The cart is now accelerating forward and the block is accelerating downward. Find the accelerations of bodies.

Problem 2.4

A ball of mass m_B=0.1 kg is approaching a resting textbook of mass m_T=1 kg at angle q =30º to its surface with speed 5 m/s. Find the momentum acquired by the textbook in result of collision.

Problem 2.5

Two blocks bound together by a string are sliding down a flat metal incline that makes an angle q =30º with the horizontal. Draw the diagram of forces applied to the blocks.

Problem 2.6

A block of mass *m*=0.2 kg rests on a horizontal surface. The block is due west of a west-facing wall. The block is attached to the wall by an ideal massless uncompressed/unstretched spring whose force constant is *k*=0.12 N/m. The spring is perpendicular to the wall. The friction constant for the block and the surface equals 0.05. A person pulls the block a distance *x* directly away from the wall and releases it from rest. Draw the forces diagram of the block appropriate for the first instant after release. Calculate initial acceleration of the block.

Homework #2/2

Problem 2.5

Two blocks bound together by a string are sliding up a flat metal incline that makes an angle q =30º with the horizontal. Draw the diagram of forces applied to the blocks.

Problem 2.6

A block of mass *m* =0.2 kg rests on a frictionless horizontal surface. The block is due west of a west-facing wall. The block is attached to the wall by an ideal massless uncompressed/unstretched spring whose force constant is *k*=0.12 N/m. The spring is perpendicular to the wall. A person pulls the block a distance *x* directly away from the wall and releases it from rest. Draw the free body diagram of the block appropriate for the first instant after release. Provide the corresponding table of forces Draw the forces diagram of the block appropriate for the first instant after release. Calculate initial acceleration of the block.

Homework #2/3

Problem 2.5

Two blocks bound together by a string are resting on a flat metal incline that makes an angle q =30º with the horizontal. Draw the diagram of forces applied to the blocks.

Problem 2.6

A block of mass *m* =0.2 kg rests on a frictionless horizontal surface. The block is due north of a north-facing wall. The block is attached to the wall by an ideal massless uncompressed/unstretched spring whose force constant is *k*=0.12 N/m. The spring is perpendicular to the wall. A person pulls the block a distance *x* directly away from the wall and releases it from rest. Draw the free body diagram of the block appropriate for the first instant after release. Provide the corresponding table of forces Draw the forces diagram of the block appropriate for the first instant after release. Calculate initial acceleration of the block.

Problem 2.5

A ball of mass *m*=2 kg hangs at rest, suspended by a string. Draw the forces diagram for the ball, and, find the tension of the string.

Problem 2.6

A block of mass *m* =1kg is resting on a flat metal incline that makes an angle q with the horizontal. Draw the diagram of forces applied to the block. Find the angle q if the surface has friction constant equal to 0.1.

Problem 2.5

A block of mass m=3 kg lies on an incline that makes an angle q =45º with the horizontal. Draw the forces diagram for the block, and, find the normal reaction of the surface.

Problem 2.6

A block of mass m =1kg is sliding up a flat metal incline (a flat metal ramp) that makes an angle q =45º with the horizontal. The block is slowing down. Draw the diagram of forces applied to the block. Find the acceleration of the block if the surface has friction constant equal to 0.1.

Homework #2/6

Problem 2.5

A ball of mass *m* hangs at rest, suspended by a string. Draw the forces diagram for the ball.

Problem 2.6

A block of mass *m* =1kg is sliding up a flat metal incline (a flat metal ramp) that makes an angle q =30º with the horizontal. The block is slowing down. Draw the diagram of forces applied to the block.

Homework #2/7

Problem 2.5

A ball of mass *m*=1 kg hangs at rest, suspended by two strings which meet at angle q =30º. Draw the forces diagram for the ball.

Problem 2.6

A block of mass *m* =1kg is sliding down a flat metal incline (a flat metal ramp) that makes an angle q =30º with the horizontal. The block is slowing down. Draw the diagram of forces applied to the block. Find the acceleration of the block if the surface has friction constant equal to 0.1.

Homework #2/8

Problem 2.5

A block of mass *m*=3 kg lies on a horisintal surface. Draw the forces diagram for the block, and, find the normal reaction of the surface.

Problem 2.6

A block of mass *m* =0.2 kg is mowing on a frictionless horizontal surface under the action of force of 10 N applied to it. Draw the forces diagram of the block. Calculate acceleration of the block.

Homework #2/9

Problem 2.5

A block of mass *m=1* kg lies on a horisintal surface. Draw the forces diagram for the block, and, find the normal reaction of the surface.

Problem 2.6

A block of mass *m* =0.2 kg is mowing on a frictionless horizontal surface under the action of force of 10 N applied to it. Draw the forces diagram of the block. Calculate acceleration of the block.

Homework #2/10

Problem 2.5

A ball of mass *m*=1 kg hangs at rest, suspended by two strings which meet at angle q =45º. Draw the forces diagram for the ball, and, find the tension of the strings.

Problem 2.6

A block of mass *m* =0.2 kg is mowing on a horizontal surface under the action of force of 10 N applied to it. Draw the forces diagram of the block. Calculate acceleration of the block if the friction constant equals 0.1.