Physics 200 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Practice Test – Newton’s Laws in 2-D



For each problem, enter the missing information into the table.

1. Two segments of rope are supporting an object. Segments are angled at the same angle, relative to horizontal.

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Magnitude** | **Units** | **Direction** |
|  Both Angles | 40 | degrees | relative to horizontal |
| Mass of object | 80 | kg | NA |
| Weight of hanging object |  |  |  |
| Vertical component of tension in the left string |  |  |  |
| Tension of left string |  |  |  |



2. A sliding mass on an incline is connected via a string and pulley to a hanging mass. µk is given.

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Magnitude** | **Units** | **Direction** |
| Angle of incline to horizontal (degrees) | 50 | degrees | Above rightward |
| Sliding mass (kg) | 12 | kg | NA |
| Hanging mass (kg) | 5 | Kg | NA |
| Coefficient of friction | 0.2 | NA | NA |
| Weight of sliding mass (N) |  |  |  |
| Perpendicular Component of sliding object weight (N) |  |  |  |
| Parallel Component of sliding object weight (N) |  |  |  |
| Weight of hanging object (N) |  |  |  |
| Normal Force acting on sliding object (N) |  |  |  |
| Friction (N) |  |  |  |
| Net Force (N) |  |  |  |
| Acceleration (N) |  |  |  |
| String Tension (N) |  |  |  |

3. An object is hanging by a rope from the ceiling of a train car. The train car is enclosed, so there is no drag force acting on the object. The rope makes a constant angle with the horizontal ceiling.

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Magnitude** | **Units** | **Direction** |
| Mass (kg) | 3 | kg | NA |
| Angle between rope and horizontal ceiling (degrees) | 70 | degrees | 70 degrees below rightward |
| Weight of hanging object (N) |  |  |  |
| Vertical component of tension (N) |  |  |  |
| Tension (N) |  |  |  |
| Horizontal Component of tension (N) |  |  |  |
| Acceleration of Hanging Object (N) |  |  |  |



4. A sliding box is being pulled by a rope. The rope extends to the right of the mass at an upward angle, relative to horizontal. The box slides horizontally to the right.

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Magnitude** | **Units** | **Direction** |
| Box Mass | 6 | kg | NA |
| Angle of rope | 40 | degrees | Above rightward |
| Coefficient of Kinetic Friction | 0.4 | NA | NA |
| Force applied by rope | 60 | N | 40 degrees above rightward |
| Box Weight |  |  |  |
| Y component of Rope Pulling Force |  |  |  |
| X component of Rope Pulling Force |  |  |  |
| Normal Force of surface against box |  |  |  |
| Friction |  |  |  |
| Net Force acting on Box |  |  |  |
| Box Acceleration |  |  |  |