

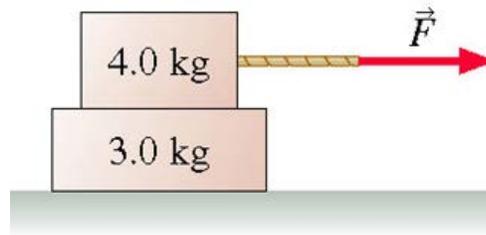


Polytechnic Tutoring Center

Final Review – PH 1013 Fall 2021

Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.

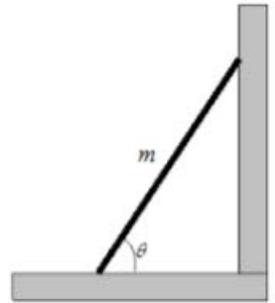
1. A stone is thrown at an angle of 35° above the horizontal with an initial speed of 6.3 m/s. What will be the speed of the stone 0.12 seconds after it was thrown?
a) 1.89 m/s b) 1.15 m/s c) 5.71 m/s d) 3.75 m/s e) 4.55 m/s
2. In the picture below, the 4 kg block is pulled with a force of 21 N. What must the coefficient of static friction between the blocks be such that the 3 kg block does not separate? μ_k between the 3 kg block and the floor is 0.11.



- a) 0.29 b) 0.34 c) 0.38 d) 0.42 e) 0.47
3. A planet orbits a star with a period of 16.7×10^7 s. The radius of the orbit is 6.7×10^{10} m. Find the planet's centripetal acceleration.
a) $5.03 \times 10^{-4} \text{ m/s}^2$ b) $1.57 \times 10^{-3} \text{ m/s}^2$ c) $9.48 \times 10^{-5} \text{ m/s}^2$
d) $1.43 \times 10^{-4} \text{ m/s}^2$ e) $8.32 \times 10^{-4} \text{ m/s}^2$
 4. An astronaut travels to a faraway planet, where he finds that the acceleration due to gravity on the planet's surface is 5.5 m/s^2 . If the planet has the same radius as that of the earth, what is the escape speed for the planet?
a) 8.38 km/s b) 9.45 km/s c) 9.11 km/s d) 8.75 km/s e) 10.7 km/s
 5. A car 1500 kg speeding carelessly along a street at 30 m/s collides with a parked car 2000 kg, collapsing into it. How much time elapses if the two slide 55 m before stopping?
a) 2.21 s b) 3.41 s c) 4.96 s d) 6.66 s e) 8.56 s

6. A 5 kg ladder of uniform mass distribution leans against a frictionless wall. The ladder makes an angle $\theta = 63^\circ$ with the ground. Find the magnitude of the force exerted by the ladder on the wall.

a) 12.5 N b) 15.0 N c) 11.2 N d) 17.5 N e) 9.99 N



7. A block initially at rest slides 6 m down a 40° incline and 6.5 m along a horizontal surface before once again coming to rest. Assuming the coefficient of kinetic friction is the same for both surfaces, what is it?

a) 0.424 b) 0.401 c) 0.382 d) 0.348 e) 0.319

8. A 1.5 kg block connected to a vertical spring stretches the spring a distance of 12 cm when the block is at rest. Find the frequency of the block when it is given a slight push downwards.

a) 2.03 Hz b) 1.44 Hz c) 1.58 Hz d) 1.12 Hz e) 1.76 Hz

9. A stationary horizontal platform is free to rotate about its vertical axis. The radius of the platform $R = 1.6$ m, and its moment of inertia is $660 \text{ kg}\cdot\text{m}^2$. A 43 kg boy jumps on the rim of the platform with the velocity 2.2 m/s tangential to the rim. What will be the angular speed of the platform with the boy?

a) 0.234 rad/s b) 0.197 rad/s c) 0.202 rad/s d) 0.113 rad/s
e) 0.156 rad/s

10. A uniform plank of mass 22 kg and length 12 m rests horizontally on two supports S1 and S2. Support S2 is 3.2 m from the right end of the plank. What's the furthest distance from S2 that a 53 kg box can be placed without the plank tipping over?



a) 3.14 m b) 1.16 m c) 2.75 m d) 1.69 m e) 2.22 m