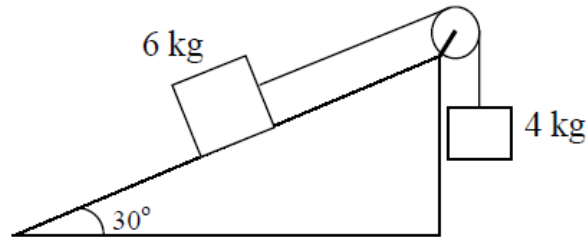


**BA SANGAM COLLEGE**  
**YEAR 13**  
**PHYSICS**  
**WORKSHEET 4**

1. Which of the following is a requirement for conservation of angular momentum?
  - A. The net force on the body is zero.
  - B. The net torque on the body is zero.
  - C. The kinetic energy of the body is zero.
  - D. The net momentum of the body is zero
  
2. Which of the following rotational quantities is analogous to force in linear motion?
  - A. Inertia
  - B. angle in radians
  - C. angular speed
  - D. Torque
  
3. If a net torque is applied to an object, then that object would experience
  - A. an angular acceleration.
  - B. a constant angular speed.
  - C. a constant moment of inertia.
  - D. an increasing moment of inertia
  
4. A group of students measured the length of a glass slide **as  $6.8 \pm 0.1 \text{ cm}$**  and the width as  **$2.6 \pm 0.1 \text{ cm}$** . Calculate the area of the glass slide with the correct absolute uncertainty.
  
5. Show that the equation  $x = \frac{1}{2}gt^2$  is dimensionally consistent.
  
6. Two quantities x and y are related by the equation  $y=0.25x^2$ .
  - (i) Express the equation  $y=0.25x^2$  in logarithmic form that can be used to draw a straight line graph.
  - (ii) If a graph of **log y** versus **log x** is drawn, find the values of the **gradient** and **y-intercept**.

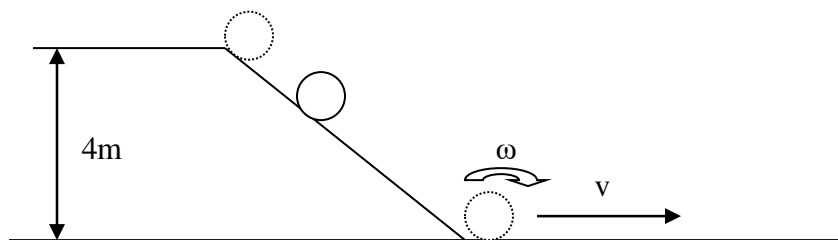
7. Obtain a linear graph for the relation  $m = Kb^n$

8. A 6kg mass rests on a  $30^\circ$  inclined plane. The coefficient of friction between the mass and the plane is 0.1.



When a 4kg mass is connected via a string and pulley as shown, the masses start to move.

- Calculate the force of friction on 6kg mass.
  - Hence determine the acceleration of the system.
9. A car rounds an unbanked curve of radius 40m without skidding at a speed of 15m/s. What is the coefficient of friction between the tires and the road?
10. The flywheel of a motor has a mass of 500kg and a moment of inertia of  $575\text{kgm}^2$ . The motor develops a constant torque of 210Nm as the flywheel starts from rest.
- What is the angular acceleration of the flywheel?
  - What will be its angular velocity after making four revolutions?
  - How much time was taken to make the four revolutions?
11. A barrel of moment of inertia,  $(I = mr^2) = 0.6\text{kgm}^2$  about its axis is rolled down a slope of height 4m as shown below.



The barrel has a mass of 15kg.

- What is the total energy at the top of the slope?
- Determine the linear and the angular velocity of the barrel at the foot of the slope?
- Calculate the translational and the rotational kinetic energy at the foot of the slope?