PENANG SANGAM HIGH SCHOOL
YEAR 13 PHYSICS
WORKSHEET 4

1. A measurement of a length is given as: X = 0.25 ± 8%. The correct expression for the square of X is:

   A. $X^2 = 0.0625\ m^2 \pm 8\%$
   B. $X^2 = 0.0625\ m^2 \pm 0.01\ m^2$
   C. $X^2 = 0.0625\ m^2 \pm 16\%$
   D. $X^2 = 0.0625\ m^2 \pm 64\%$

2. Which of these prefixes represent 10^{-9} meters ?

   A. pico
   B. micro
   C. giga
   D. nano

3. The mass of an object is calculated from experimental data to be 38.5671 g.
   The ± absolute error in the mass was determined to be ± 0.2 g. The mass should be reported, in g , as

   A. 39
   B. 38.6
   C. 38.57
   D. 38.567

4. An elevator on the ground floor is ascending to the fourth floor of a building. If the acceleration on the lift is zero then which of the following statement correctly describes the motion of the elevator

   A. stationary
   B. a constant velocity
   C. accelerating
   D. decelerating

5. A glass cube is measured to be 15.5 ± 0.2 cm.
   Find its volume in cm^3 along with its absolute uncertainty. ($V = L^3$)

Hint: V = 15.5^3 ± 3 x (% Unc.)

6. Show that the formula $V_f^2 = V_i^2 + 2ad$ is dimensionally consistent, where d is the distance travelled in time, t, v_i is the initial velocity, v_f is the final velocity and a is the acceleration.

$$V_f^2 = V_i^2 + 2ad$$

Hint: $(m/s)^2 = (m/s)^2 + 2\,(m/s^2)\,m$

$(L/T)^2 = (L/T)^2 + 2\,(L/T^2)\,L$ **simplify**

7. A boy stands on a scale in a lift. When the lift is stationary the reading on the scale is 75 kg. Calculate the reading on the scale when the lift accelerates upwards at 3 ms^{-2} .

Hint: $R = Wt + ma$

$= mg + ma$

8. An object hangs from a spring balance in an elevator accelerating upward at 5ms^{-2}.
The reading on the balance is 500N.
Calculate the:

(i) mass of the object. **Hint:** $R = mg + ma$

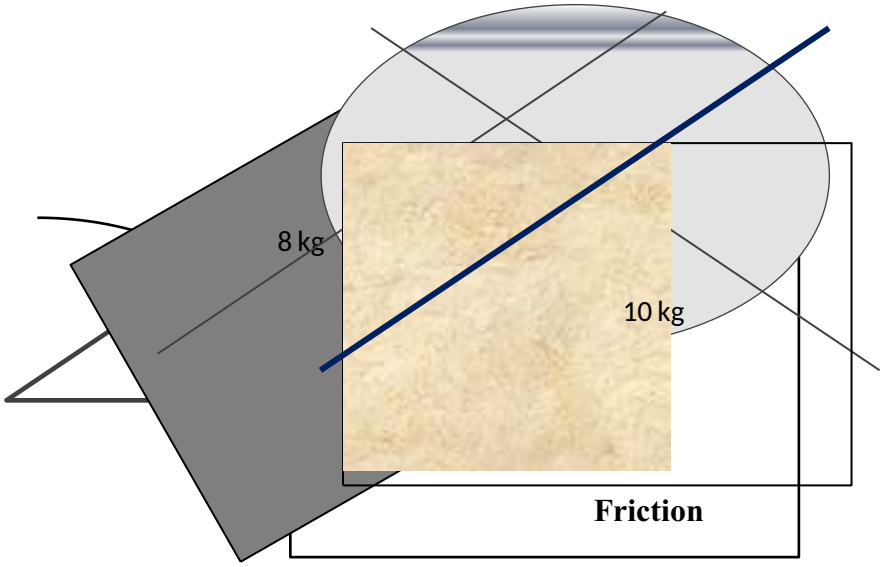
$m = R/(g + a)$

(ii) reading on the balance when the lift is stationary. **Hint: a = 0 m/s**

(iii) reading on the balance when the lift accelerates downwards at 6ms^{-2}.

Hint: $R = mg - ma$

9. The coefficient of kinetic friction between the 8 kg object and the plane is 0.15.



Calculate:

(i) acceleration of the system. **Hint: find the weight of 10kg mass.**

Find F_x and acting on 8 kg

Use : ∑ F = ∑ma

(ii) tension in the string.

Hint: for the 10kg mass; Wt - T = ma

T = Wt - ma

T = mg - ma

10. The coefficient of friction between a load of sand and the tray of a truck in which it carries is 0.6. At what angle to the horizontal does the truck tray have to be tilted before the sand starts to slide out?
Hint: $F_x = f$

$mg \sin\Theta = \mu \times mg \cos\Theta$

Tan Θ = μ