1. Which instrument is **best** to measure the outer diameter of a test tube?
    A   meter ruler
    B. micrometer screw gauge
    C. vernier caliper
    D. measuring tape

2. The point where a force causes the system to move without rotation is
    A. edge of a body.
    B. centre of mass.
    C. centre of rotation.
    D. mid-point of a body.

3. If a net torque is applied to an object, then that object will experience

    A. a constant angular speed.
    B. a constant moment of inertia.
    C. an angular acceleration.
    D. an increasing moment of inertia.

4. Which of the following combinations of units have the dimensions of force?

    A. $kgms^{-1}$
    B. kg/ms^{2}
    C. $kgms^{-2}$
    D $kgms^{2}$

5   At what maximum speed can a motor vehicle round a circle of 35 m radius on a level road if the coefficient of friction between the tyres and the road is 0.4?

    A. 140 m/s   B. 14 m/s
    C. 11.8 m/s   D. 8.73 m/s

6. A rotation of 600 rev/min is equivalent to

    A. 6 π rad/s
    B. 6 2π rad/s
   C. 1200 π rad/s
    D. 20 π rad/s

7. A body which consist of two small spheres of masses 1 kg and 2 kg joint by a light rigid rod of length 3.0 m. What is the **moment of inertia**   of   a

body about an axis through the   midpoint, O   and
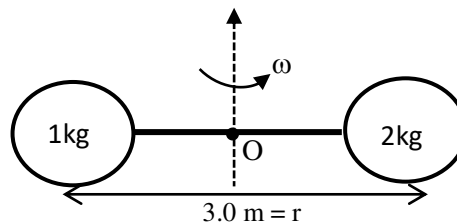
perpendicular to the rod? $I = \sum m.r^2$

8. A frictionless cylindrical pulley has a radius of 0.3 m. A 0.5 kg mass is attached to a string which is wrapped around the pulley. The mass has an acceleration of 4 m/s² downwards.

α

0.3 m

T

0.5 kg ☐ ↓ 4 m/s²
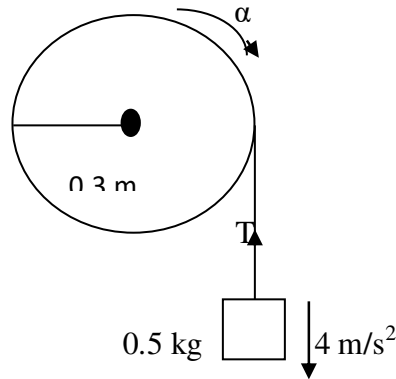
Calculate:

i)   The tension in the string, T.   use: Wt – T = ma

ii)   The torque on the pulley due to the tension in the string. Use : ʈ = F.r
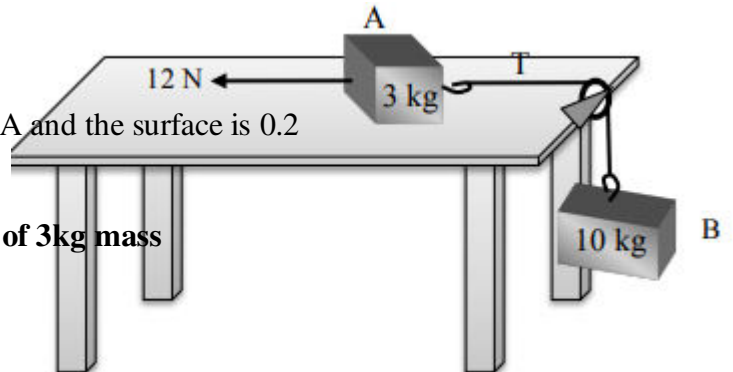   ʈ = T.r

iii)   The angular acceleration of the pulley. Use: a = r α

iv)   The moment of inertia, I, of the pulley.   Use: ʈ = I α

9.   Two masses are connected as shown. The 3 kg mass is being pulled to the left with a force of 12 N.

A

12 N ←   3 kg   T

The coefficient of friction (μ) between mass A and the surface is 0.2
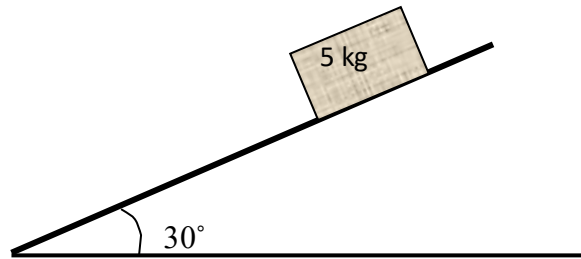Determine the
(i)   friction on mass A.
         Use: f = μ N   ;   N = weight of 3kg mass

10 kg   B

(ii)   net force on the system   ; **(12N ,   frictional force, Weight of 10 kg mass)**

(ii)   tension, T in the cable.   **First find acceleration then taking the 10kg mass apply**
          Wt – T = ma

10.   A mass of 5kg is placed on a slope inclined at 30˚ to the horizontal.

(i)   Determine the force needed to keep the block at rest on top of the slope.
        Find F_x

(ii)   What will be the acceleration of the block when released.
        Equate F_x = ma

(iii)   Find the normal force applied to the mass by the slope. (Force perpendicular to the surface)

(iv)   If a friction of 5N acts on the block, find the coefficient of kinetic friction.
            f = μ . N ;   find μ

(v)   Determine the acceleration of the block due to the friction of 5N acting.
        $\sum$F = ma
   **F_x – f = ma**

11.   A small mass of 0.5 kg attached to a light cord 0.30 m long, revolves in a horizontal circle. If the mass revolves at 2 revs / sec, Calculate:

(i)   the velocity of the mass.   **V = 2πrf**

(ii)   the tension in the cord.   **Hint: Tension is the centripetal Force**

12.   A student decides to move a box of books of mass of 25 kg, on a 10° inclined surface with a force of 80 N which acts at an angle of 25° above the line of the incline. The coefficient of friction between the surface and the mass is 0.03. Calculate the acceleration of the box up the slope.
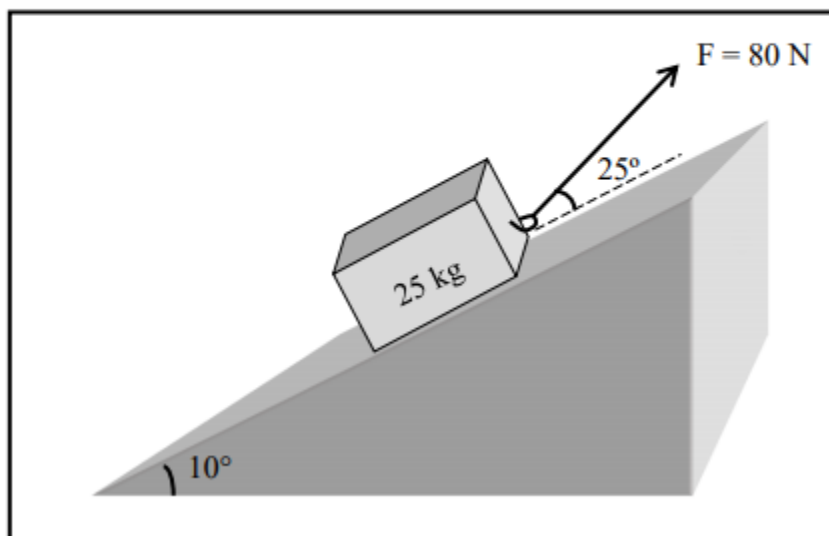
Check your NOTES

Find all the forces acting
1.   force component of 80N up the slope,
2. F_x force down the slope due to 25 kg mass
3.   frictional force on the 25kg mass.
Determine the net force considering the directions and solve for a

        $\sum F = ma$