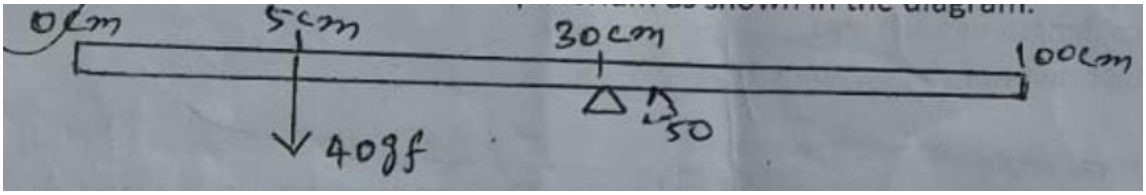
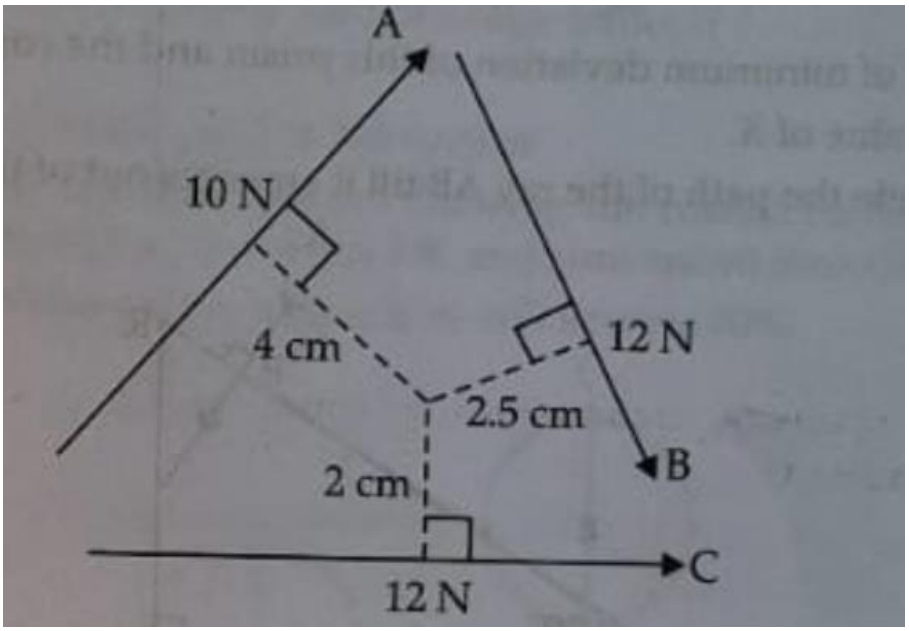
1. A uniform meter scale is in equilibrium as shown in the diagram below:



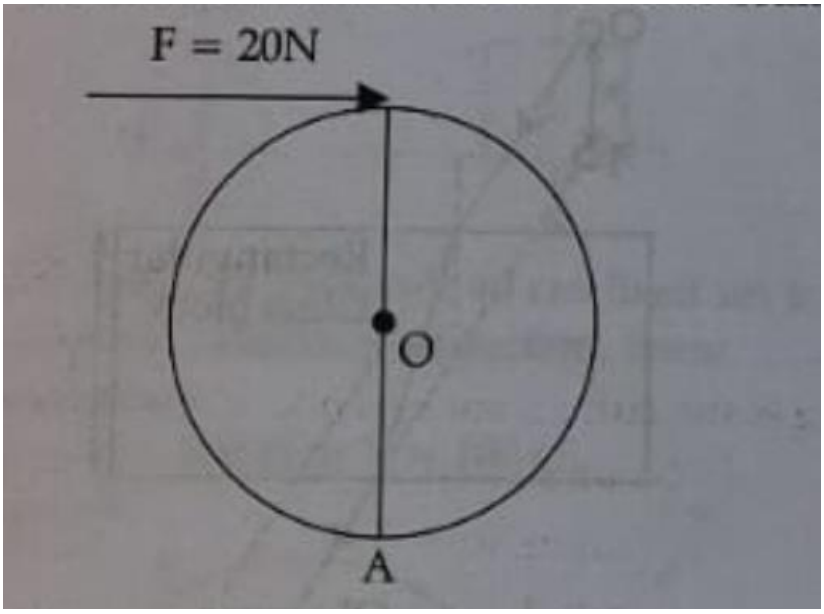
a) Calculate the weight of the meter scale.

b) Which of the following is correct to keep the rider in equilibrium when 40g weight is shifted to 0 mark? F is shifted towards 0 cm or F is shifted towards 100cm.

2. Calculate this moment in SI unit:



3. If the moment of F about the centre of a wheel O is 6 Nm. Then calculate the moment of F about A.



4. A meter scale of weight 50gf can be balanced at 40cm mark without any weight suspended on it.

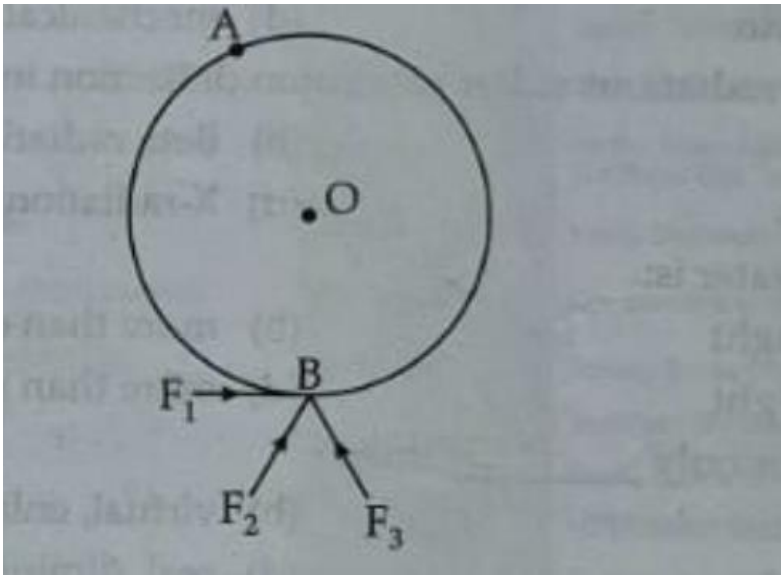
a) If this ruler is cut at its centre, then state which part [0 to 50 cm or 50 to 100cm] of the ruler will weigh more than 25gf.

b) What minimum weight placed on this meter ruler can balance this ruler when it is pivoted at its centre?

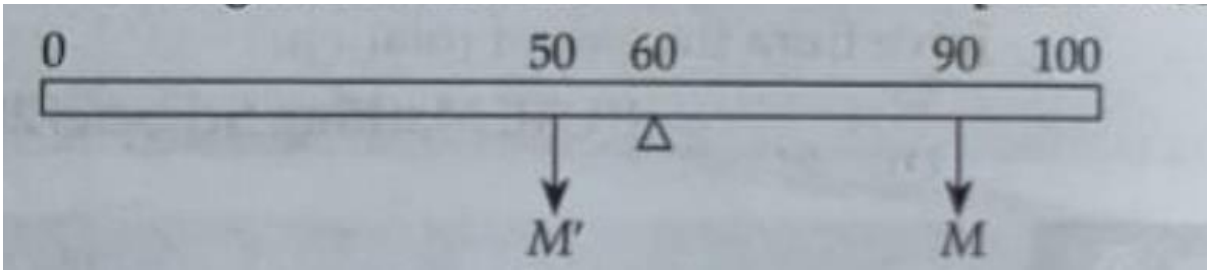
5. The Diagram shows wheel O at point A. Three equal forces F_1, F_2 and F_3 act at point B on the wheel.

a) Which force will produce maximum moment about A?

b)Give a reason for your answer in (a).



6. A uniform meter scale is kept in equilibrium when supported at the 60cm mark and a mass M is suspended from the 90cm mark as shown in the figure. State the reasons, whether the weight of the scale is greater than, less than or equal to the weight of mass M.



7. A Couple is formed by two equal and opposite forces of 40N each. The Distance between the line of action of forces is 5m. Calculate the moment of couple. If the point, about which rotation takes place, is shifted, will there be any change in moment of couple?

8. A uniform half meter ruler balances horizontally on a knife edge at 29cm mark when a weight of 20gf is suspended from one end.

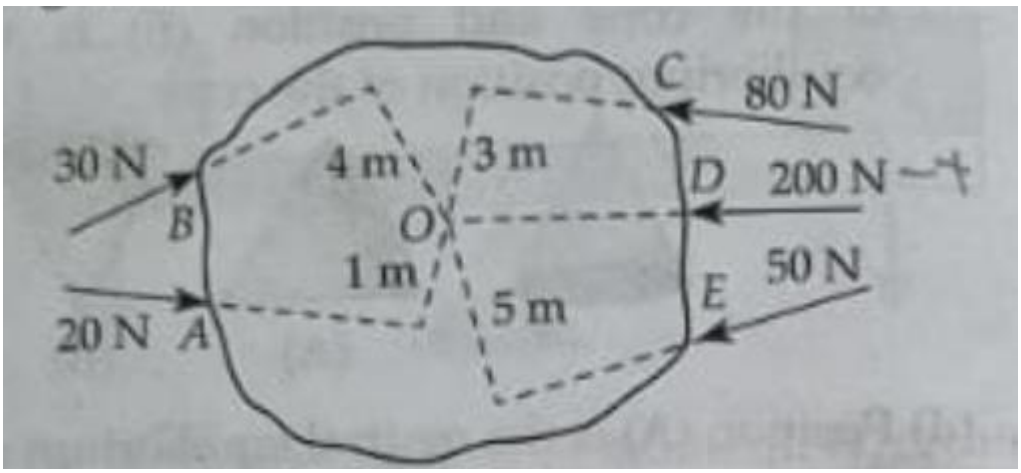
   i) Draw a diagram of the arrangement.
   ii) What is the weight of the half meter ruler?

9. A boy of mass 30kg is sitting at a distance of 2m from the middle of the sea saw. Where should a boy of mass 40kg sit so as to balance the see saw?

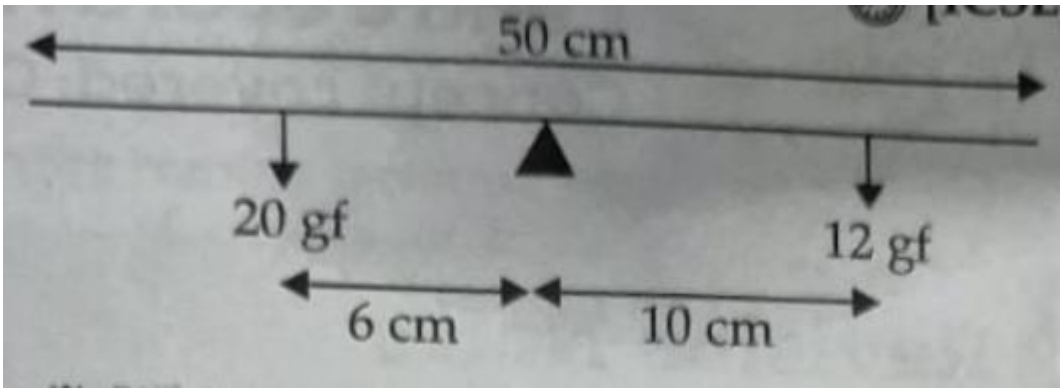
10. A man can open a nut by applying a force of 150N by using a lever handle of length 0.4m. What should be the length of the handle, if he is able to open it by applying a force of 60N.

11. A body of mass 1.50kg is dropped from the second floor of a building which is at a height of 12m. What is the force acting on it during the fall?

12. Calculate the resultant torque from the following diagram:



13. A half meter rod is pivoted at the centre with two weights of 20gf and 12gf suspended at a perpendicular distance of 6cm and 10cm from the pivot respectively as shown below.



i) Which of the two forces acting on the rigid rod causes clockwise moment?

ii) Is the rod in equilibrium?

iii) The direction of 20gf force is reversed. What is the magnitude of the resultant moment of the forces on the rod?