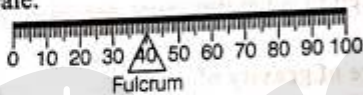


# PYQs Previous Years Questions

## 1 Mark Questions

- Clockwise moment produced by a force about a fulcrum is considered to be (ICSE 2023)
  - positive
  - negative
  - zero
  - None of these
- SI unit of moment is (ICSE SQP 2023)
  - kgf-m
  - N-m
  - gf-m
  - N-cm
- The relation between CGS and SI unit of moment of force is (ICSE 2022 Sem-I)
  - $1 \text{ N-m} = 10^5 \text{ dyne-cm}$
  - $1 \text{ N-m} = 10^5 \text{ dyne}$
  - $1 \text{ N-m} = 10^7 \text{ dyne-cm}$
  - $1 \text{ dyne-cm} = 10^7 \text{ N-m}$
- The diagram below shows the balanced position of a meter scale.



Which one of the following diagrams shows the correct position of the scale when it is supported at the centre? (ICSE 2022 Sem-I)

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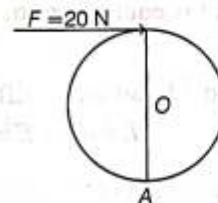
- If the centre of gravity of a meter scale of mass 80 g lies at the 45 cm mark, then which one of the following diagrams will show the balanced position of the scale? (ICSE SQP 2022 Sem-I)

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- What is the weight of a body placed at the centre of the earth? (ICSE 2014)
- State the SI unit of the momentum of the body. (ICSE 2002)

## 2 Marks Questions

- What is the position of centre of gravity of a triangular lamina?
  - When this triangular lamina is suspended freely from any one vertex, what is the moment of force produced by its own weight in its rest position? (ICSE 2023)
- State two factors that affects the centre of gravity of the body. (ICSE SQP 2023)
- If the moment of  $F$  about the centre of a wheel  $O$  is 6 N-m, then calculate the moment of  $F$  about  $A$ . (ICSE SQP 2023)

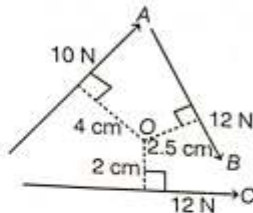


### KEY idea

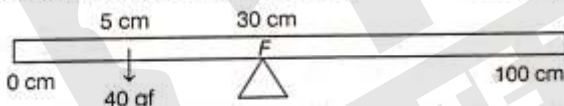
To calculate moment of force or torque about any point, first identify point about which the body rotates, then by knowing perpendicular distance between point of rotation and the direction of force, we calculate torque by using

$$\tau = \text{force} \times \text{perpendicular distance}$$

11. (i) Name the force which produces maximum moment about.  
(ii) Calculate this moment in SI unit. (ICSE SQP 2023)

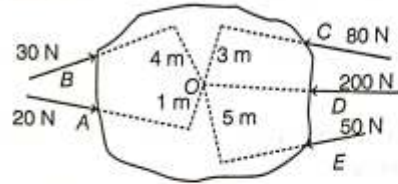


12. (i) Define moment of force.  
(ii) Write the relationship between the SI and CGS unit of moment of force. (ICSE 2020)
13. (i) Define couple.  
(ii) State the SI unit of moment of couple. (ICSE 2019)
14. A brass ball is hanging from a stiff cotton thread. Draw a neat labelled diagram showing the forces acting on the brass ball and cotton thread. (ICSE 2017, 14)
15. The distance between two bodies is doubled. How is the magnitude of gravitational force between them affected? (ICSE 2017)
16. Why is a jack screw provided with a long arm? (ICSE 2017)
17. A uniform meter scale is in equilibrium position. Calculate the mass of the ruler. (ICSE SQP 2017)



18. Derive the relation between CGS and SI unit of force. (ICSE SQP 2017)
19. Classify the following into contact and non-contact forces (ICSE 2017)
- Tension
  - Friction
  - Gravitational force
  - Magnetic force
20. Where is the centre of gravity of the following objects situated? (ICSE SQP 2017)
- Ring
  - Rhombus
  - Scalene triangle
  - Cylinder

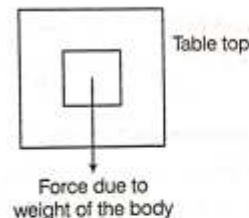
21. Calculate the resultant torque from the following diagram. (ICSE SQP 2017)



**KEY Idea**

Calculate the resultant torque with the formula  $\tau_{net} = \text{Clockwise torque} - \text{Anti-clockwise torque}$  and Torque due to 200 N as zero because it is passing through point O.

22. (i) Give an example of a non-contact force which is always of attractive nature.  
(ii) How does the magnitude of this non-contact force on the two bodies depend on the distance of separation between them? (ICSE 2016)
23. (i) Define equilibrium.  
(ii) In a beam balance, when the beam is balanced in a horizontal position, it is in \_\_\_\_\_ equilibrium. (ICSE 2015)
24. When a body is placed on a table top, it exerts a force equal to its weight downwards on the table top but does not move or fall.



- (i) Name the force exerted by the table top.  
(ii) What is the direction of the force? (ICSE 2015)
25. (i) On what factor does the position of the centre of gravity of a body depend?  
(ii) What is the SI unit of the moment of force? (ICSE 2015)
26. Name the factors affecting the turning effect of a body. (ICSE 2015)
27. A nut is opened by a wrench of length 20 cm. If the least force required is 2N, find the moment of force needed to loosen the nut. (ICSE 2015)



28. A force is applied on

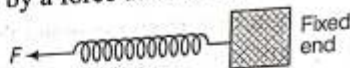
- (i) a rigid body and
- (ii) a non-rigid body.

How does the effect of the force differ in the above two cases? (ICSE 2014)

29. (i) Where is the centre of gravity of a uniform ring situated?

(ii) The position of the centre of gravity of a body remains unchanged even when the body is deformed. State whether the statement is true or false. (ICSE 2013)

30. One end of a spring is kept fixed while the other end is stretched by a force as shown in the diagram.



(i) Copy the diagram and mark on it the direction of the restoring force.

(ii) Name one instrument which works on the above principle. (ICSE 2013)

31. Give any two effects of a force on a non-rigid body. (ICSE 2013)

32. A boy of mass 30 kg is sitting at a distance of 2 m from the middle of a see-saw. Where should a boy of mass 40 kg sit, so as to balance the see-saw? (ICSE 2012)

33. (i) What is meant by the term moment of force?

(ii) If the moment of force is assigned a negative sign, then will the turning tendency of the force be clockwise or anti-clockwise? (ICSE 2012)

34. (i) What are non-contact forces?

(ii) How does the distance of separation between two bodies affect the magnitude of the non-contact force between them? (ICSE 2012)

35. (i) Define 1 kgf.

(ii) How is it related to the SI unit of force? (ICSE 2012)

36. A man can open a nut by applying a force of 150 N by using a lever handle of length 0.4 m. What should be the length of the handle, if he is able to open it by applying a force of 60 N? (ICSE 2011)

37. Where does the position of centre of gravity lie for

- (i) a circular lamina?
- (ii) a triangular lamina?

(ICSE 2011)

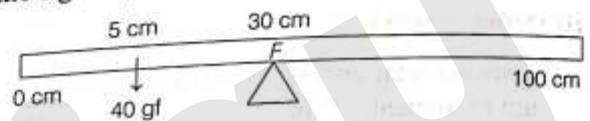
38. (i) Define one newton.

(ii) Write the relation between SI unit and CGS unit of force. (ICSE 2011)

39. A body of mass 1.5 kg is dropped from the 2nd floor of a building which is at a height of 12 m. What is the force acting on it during its fall? (Take,  $g = 9.8 \text{ m/s}^2$ ) (ICSE 2008)

### 3 Marks Questions

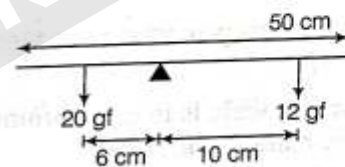
40. A uniform meter scale is in equilibrium as shown in the figure given below.



(i) Calculate the weight of the meter scale.

(ii) Which of the following option is correct to keep the ruler in equilibrium, when 40 gf-wt is shifted to 0 cm mark?  $F$  is shifted towards 0 cm or  $F$  is shifted 100 cm. (ICSE 2019)

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



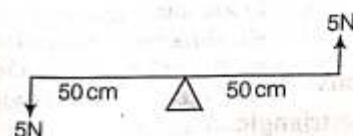
(i) Which of the two forces acting on the rigid rod causes clockwise moment?

(ii) Is the rod in equilibrium?

(iii) The direction of 20 kgf force is reversed. What is the magnitude of the resultant moment of the forces on the rod? (ICSE 2018)

### 4 Marks Question

42. Two forces each of 5 N act vertically upwards and downwards, respectively. On the two ends of a uniform meter rule which is placed at its mid-point as shown in the diagram. Determine the magnitude of the resultant moment of these forces about the mid-point. (ICSE 2014)



## **PYQs** Previous Years Questions

### 1 Mark Questions

1. Why is the motion of a body moving with a constant speed around a circular path said to be accelerated?  
(ICSE 2018)
2. How does uniform circular motion differ from uniform linear motion?  
(ICSE 2017)
3. Is it possible to have an accelerated motion with a constant speed? Explain.  
(ICSE 2014)

### 2 Marks Question

4. Explain the motion of a planet around the sun in a circular path.  
(ICSE 2015)

### 3 Marks Questions

5. A stone of mass  $m$  is rotated in a horizontal circular path with a uniform speed by tying a strong string with

the help of your hand. Answer the following questions:

- (i) Is the stone moving with a uniform or variable speed?
  - (ii) Is the stone moving with a uniform acceleration? In which direction does the acceleration act?
  - (iii) What kind of force acts on the hand and state its direction?  
(ICSE 2016)
6. With reference to their direction of action, how does a centripetal force differ from a centrifugal force?  
(ICSE 2013)
  7. (i) Which of the following remains constant in a uniform circular motion, speed or velocity or both?  
(ii) Name the force required for a uniform circular motion. State its direction.  
(ICSE 2012)