

FORCE

INCLUDED IN THIS SECTION

- ✓ Multiple-Choice Questions (MCQs)
- ✓ Solutions

1. **Force = _____**
 - a) mass \times velocity
 - b) mass \times acceleration
 - c) mass \times time
 - d) velocity \times acceleration
2. **Give one way to reduce the moment of a force about an axis of rotation.**
 - a) Decreasing the perpendicular distance
 - b) Increasing the perpendicular distance
 - c) No change in perpendicular distance
 - d) None of the above
3. **A rotational motion around a fixed axis is an example of _____ motion.**
 - a) Linear
 - b) Rotational
 - c) Both a and b
 - d) None of the above
4. **When a rigid body is acted upon by a force, how many different type of motions can you observe?**
 - a) 3
 - b) 4
 - c) 2
 - d) 1
5. **When an object moves at a fixed distance from a fixed point, what type of motion is it?**
 - a) periodic motion
 - b) the magnitude rectilinear motion
 - c) circular motion
 - d) none of the above

6. A torque is dependent on

- a) Force applied (F)
- b) The perpendicular distance of line of action of the force from the axis of rotation d
- c) Pressure on the substance
- d) Both (a) and (b)

7. CGS unit of force is _____

- a) Newton
- b) dyne
- c) Joule
- d) erg

8. 1 Newton = _____ dyne

- a) 10^5
- b) 10^6
- c) 10^7
- d) 10^8

9. The moment of a force 10 N about a point O is 50 Nm. Calculate the distance of point of application of force from the point O.

- a) 4
- b) 5
- c) 6
- d) 7

10. A nut is opened by a wrench of length 20 cm. If the least force required is 2 N, find the moment of force needed to loosen the nut.

- a) 0.4 Nm
- b) 0.5 Nm
- c) 0.6 Nm
- d) 0.7 Nm

11. When a body is placed on a tabletop, it exerts a force equal to its weight downwards, but it does not fall or move. What is the direction of the force?

- a) Vertically upward
- b) Vertically downward
- c) Horizontal
- d) None of these

12. Which of these moments is considered negative?

- a) Anticlockwise moment
- b) Clockwise moment
- c) Both a & b
- d) None of these

13. The unit of *moment of couple* is

- a) N
- b) Nm
- c) N m^{-1}
- d) N m^2

14. When a body is in equilibrium

- a) Sum of anticlockwise moments > Sum of clockwise moments
- b) Sum of anticlockwise moments < Sum of clockwise moments

- c) Sum of anticlockwise moments = Sum of clockwise moments
d) None of the above
- 15. A couple constitutes of –**
- a) A pair of equal and opposite forces whose lines of action are same
b) A pair of equal and like forces whose lines of action are same
c) A pair of equal and opposite forces whose lines of action are not same
d) A pair of equal and like forces whose lines of action are not same
- 16. The centre of gravity of a hollow sphere lies**
- a) at its topmost point
b) at its lowermost point
c) at any point on its surface
d) at its geometric centre
- 17. The centre of gravity of a triangle is**
- a) at the perimeter
b) where the median intersects
c) at the circumcentre
d) outside the triangle
- 18. Centre of gravity is usually located where –**
- a) less mass is concentrated
b) less weight is concentrated
c) more mass is concentrated
d) more weight is concentrated
- 19. The centre of gravity of a hollow cone of height h is at distance x from its vertex where the value of x is:**
- a) $h/3$
b) $h/4$
c) $2h/3$
d) $3h/4$
- 20. The point through which the whole weight of the body acts is called _____**
- a) inertial point
b) centre of gravity
c) centroid
d) midpoint
- 21. The point at which the total area of a plane figure is assumed to be concentrated is called _____**
- a) centroid
b) centre of gravity
c) central point
d) inertial point

22. Where does the centre of gravity of a uniform rod lie?

- a) At its end
- b) At its middle point
- c) At the centre of its cross sectional area
- d) Depends upon its material

23. Where does the centre of gravity of a circle lie?

- a) At its centre
- b) Outside the circle
- c) On its circumference
- d) On its diameter

24. What would be the centre of gravity of the following section (in coordinates)?



- a) (6,3)
- b) (6,6)
- c) (6,1.5)
- d) (1.5,3)

25. In a uniform motion, which of the following remains constant?

- a) Velocity
- b) Speed
- c) Acceleration
- d) Velocity and Speed

26. Centrifugal force is _____

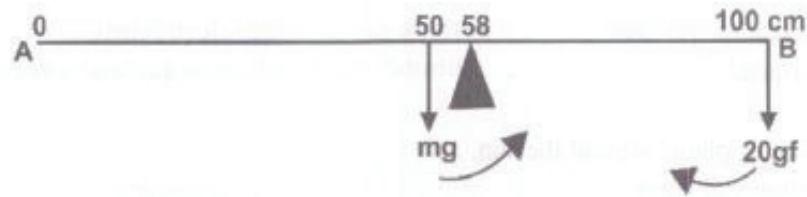
- a) a real force
- b) the force of reaction
- c) a fictitious force
- d) directed towards the centre of circular path

27. The mathematical expression for centripetal force is _____

- a) $m\omega^2/r$
- b) $m\omega/r$
- c) ω^2/r
- d) $m\omega^3/r$

28. A body of mass 10 kg, is moving with a velocity of 5 m/s in a circle of radius 5 m. What is the centripetal acceleration of the body?

- a) 5 m/s^2 c) 0.5 m/s^2
b) 25 m/s^2 d) 50 m/s^2
29. The centrifugal force always acts _____
a) towards the centre c) in tangential direction
b) away from the centre d) outside of the plane of motion
30. A body moves in a vertical circular motion. What force does it not experience?
a) Force of gravity c) Normal reaction force
b) Centripetal force d) Centrifugal force
31. Which one of the following devices acts on the principle of circular motion?
a) Centrifuge c) Ruler
b) Screw Gauge d) Vernier calliper
32. At what position in the vertical circular motion is the string's tension the least?
a) At the highest position
b) At the lowest position
c) When the string is horizontal
d) At an angle of 35° from the horizontal
33. Which of these is the cause of uniform circular motion?
a) Centripetal force c) Both of these
b) Centrifugal force d) None of these
34. In which of these motions can the speed be constant?
a) Linear motion c) Both of these
b) Uniform circular motion d) None of these
35. On what factor does the position of the centre of gravity of a body depend?
a) Only shape c) Only distribution of mass
b) Shape and distribution of mass d) None of these
36. A uniform meter rule is balanced horizontally on a knife edge placed at the 58 cm mark when a weight of 20 gf is suspended from one end.



What is the weight of the rule?

- a) 105 gf
b) 106 gf
c) 104 gf
d) None of these

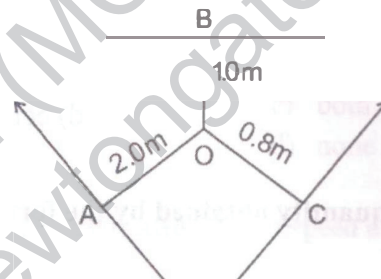
37. Where is the centre of gravity of a uniform ring situated?

- a) At the centre of ring
b) At the centre of semi-circular ring
c) At the centre of radius
d) Can't say

38. Name the force required for uniform circular motion.

- a) Centripetal force
b) Centrifugal force
c) Gravitational force
d) None of these

39. A, B and C are the three forces each of magnitude 10 N acting in the plane of paper as shown in the figure. The point O lies in the same plane. Which force has the least moment of O?



- a) A
b) B
c) C
d) None

40. What provides the necessary centripetal force in the following cases?

i. Electron moving around the nucleus.

- a) electrostatic
b) gravity
c) centripetal
d) gravitational force

ii. Moon moving around the earth.

- a) centripetal
b) gravitational force
c) electrostatic
d) gravity

iii. Whirling of stone tied to a string.

- a) gravity
b) centripetal
- c) electrostatic
d) gravitational force
- iv. Motion of planet around the sun.
- a) gravitational force
b) gravity
- c) centripetal
d) electrostatic

41. Where is the centre of gravity of the following objects situated?

- i. Ring
- a) centre of circle
b) intersection of diagonals
- c) centroid
d) midpoint of vertical axis
- ii. Rhombus
- a) centroid
b) midpoint of vertical axis
- c) centre of circle
d) intersection of diagonal
- iii. Scalene Triangle
- a) intersection of diagonals
b) centroid
- c) midpoint of vertical axis
d) centre of circle
- iv. Cylinder
- a) midpoint of vertical axis
b) centre of circle
- c) intersection of diagonals
d) centroid

42. Name the unit of physical quantity obtained by the formula $\frac{p^2}{2m}$ where p is momentum and m is mass.

- a) Joule
b) Joule / m
- c) Joule m
d) Joule m²

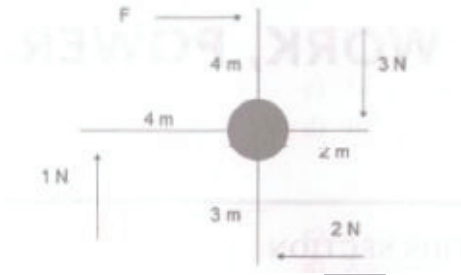
43. How is the unit electron-volt (eV) related to the S.I. unit of energy.

- a) $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$.
b) $1 \text{ eV} = 1.6 \times 10^{19} \text{ J}$.
- c) $1 \text{ eV} = 1.9 \times 10^{-19} \text{ J}$.
d) $1 \text{ eV} = 1.9 \times 10^{19} \text{ J}$.

44. The point through which the whole weight of the body acts is called?

- a) Moment of inertia
b) Centre of gravity
- c) Mid-point
d) Centre of mass

45. A windmill is pushed by four external forces as shown in the diagram below. Calculate force F required to stop the windmill from running.



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|--------|--------|
| a) 2 N | c) 6 N |
| b) 4 N | d) 8 N |

46. Uniform circular motion is an example of

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|-------------------------|----------------------|
| a) Accelerated motion | c) Linear motion |
| b) Unaccelerated motion | d) None of the above |

47. The principle involved in the working of a beam balance is

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|-------------------------|-------------------------------|
| a) Principal of moments | c) Principal of superposition |
| b) Principal of inertia | d) Principal of velocity |

48. Which of the following quantity remains constant in a uniform circular motion?

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|-------------|----------------------------|
| a) velocity | c) both velocity and speed |
| b) speed | d) none of these |

49. A particle moves in a circle of radius 20m with a linear speed of 10m/s. Find the angular velocity.

- | | |
|-------------|--------------|
| a) 40 rad/s | c) 0.5 rad/s |
| b) 5 rad/s | d) None |

50. What is needed to open a shut door?

- | | |
|-----------------|---------------------|
| a) Normal force | c) Angular velocity |
| b) Pressure | d) Moment of force |