

CLASS : XI

PHYSICS ASSIGNMENT NO. V
MOTION

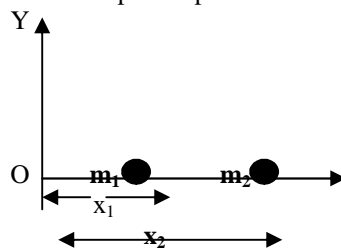
UNIT : V, CHAP : ROTATIONAL

1 Mark Type

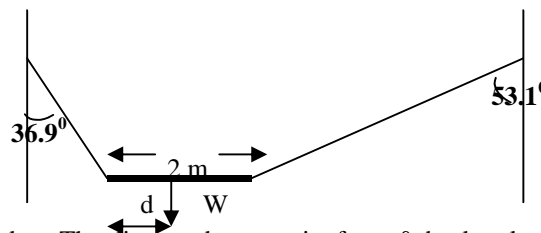
- Q1. On what factors, does the position of centre of mass of a rigid body depend?
 Q2. What is an isolated system? What will be the nature of motion of centre of mass of isolated sys?
 Q3. Which physical quantity is conserved when a planet revolves around the sun?
 Q4. Name rotational analogue of force. Give its S.I. Unit. Q5. State factors on which radius of gyration of a body depend.
 Q6. If friction can provide necessary centripetal force, why should the road be banked?
 Q7. What is a rigid body? Q8. Why are handles at max possible distance from the hinges in a door?
 Q9. Why is it easier to balance a bicycle in motion? Q10. What are the factors on which moment of inertia of a body depends?
 Q11. Why are spokes fitted in a cycle wheel? Q12. Why does a pilot not fall down when his airplane takes a vertical loop?
 Q13. If the ice on the polar caps of the earth melts, how will it affect the duration of the day?

2/3 mark type :-

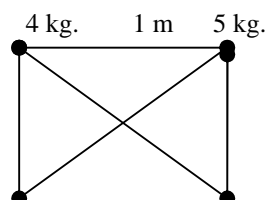
- Q14. If no external force is acting on a two body system, what will happen to :- (a) Velocity of COM. (b) Angular momentum.
 Q15. How does a diver manage to make somersaults in air?
 Q16. The angular speed of a motor wheel is increased from 1200 rpm to 3120 rpm in 16 seconds. (i) What is its angular acceleration, assuming acceleration as uniform? (ii) How many revolutions does wheel make during this time?
 Q17. State the two theorems of moment of inertia.
 Q18. What will be the centre of mass of the pair of particles described below on the x-axis?

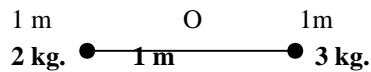


- Q19. A ring, a disc & a sphere all of same radius & mass roll down an inclined plane from same ht. h . Which of 3 reaches bottom (i) earliest (ii) latest?
 Q20. Deduce the relation between torque and angular momentum.
 Q21. A non-uniform bar of wt W is suspended at rest by 2 strings of negligible weights as shown. The angles made by strings with vertical are 36.9° & 53.1° respectively. The bar is 2m long. Cal. The distance of L of the COG of the bar from its left end.

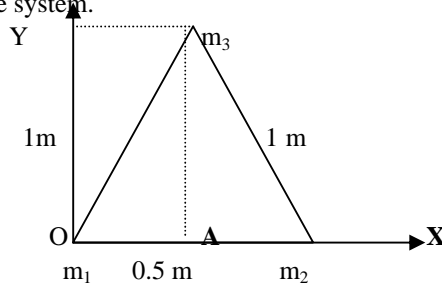


- Q22. A car weighs 1800 kg. The distance between its front & back axles is 1.8m. Its COG is 1.05m behind the front axle. Determine the force exerted by the level ground on each front wheel & each back wheel.
 Q23. Derive & define radius of gyration of a body rotating about an axis.
 Q24. 4 particles of masses 4kg, 2 kg, 3kg, & 5 kg are resp. located at four corners A, B, C & D of sq of side 1 m as shown. Cal. moment of inertia of the system about. (i) an axis passing through pt. of intersection of the diagonals & perpendicular to the plane of the square. (ii) the side AB (iii) the diagonal BD





- Q25. Energy of 484J is spent in increasing speed of a flywheel from 60 rpm to 30 rpm. Find the moment of inertia of the wheel.
- Q26. Cal. The rotational K.E. of the earth about its own axis. Mass of the earth = 6×10^{24} kg and radius of the earth = 6400 Km.
- Q27. Three masses 3, 4 and 5 Kg. are located at the corner of an equilateral triangle of side 1 m. Locate the centre of mass of the system.



- Q28. Two particles of masses 100g & 300g at a given time have positions $2\hat{i} + 5\hat{j} + 13\hat{k}$ and $-6\hat{i} + 4\hat{j} - 2\hat{k}$ respectively & velocities $10\hat{i} - 7\hat{j} - 3\hat{k}$ & $7\hat{i} - 9\hat{j} + 6\hat{k}$ ms^{-1} respectively. Determine the instantaneous position and velocity of C.M.