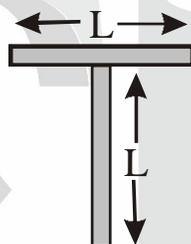


XI PHYSICS TEST FULL LENGTH -2

TIME : 2 HRS.

M.M : 45

1. A wheel of radius 0.5m is moving with a speed of 12m/s. find its angular speed? 1
2. State the condition for translational equilibrium of a body? 1
3. How is angular momentum related to linear momentum? 1
4. Two particles in an isolated system under go head on collision. What is the acceleration of the centre of mass of the system? 1
5. Find centre of mass of following diagram made up of thin uniform rod of length L. 1



6. What is radius of gyration? 1
7. Find relation between torque and angular acceleration ? 1
8. Explain why the bottom of the ship is made heavy? 1
9. Give reason why : $1 \times 5 = 5$
 - a. Some heavy boxes are loaded first below the lighter boxes in a truck.
 - b. It is difficult to open a door by pushing or pulling it near the edge.
 - c. Doors are provided with handles near the outer edges far away from the hinges.
 - d. We prefer to use a wrench of longer arm.
 - e. In a hand driven grinding machine, handle is put near the circumference of the stone or wheel.
10. Four point masses 1 kg, 1 kg, 2 kg and 2 kg are placed at the corners of a square as shown in **FIGURE-1**. Find the centre of mass of the system. 2

11. Find the position of centre of mass of the uniform planner section shown in **FIGURE-2** with respect to the origin (O) 2

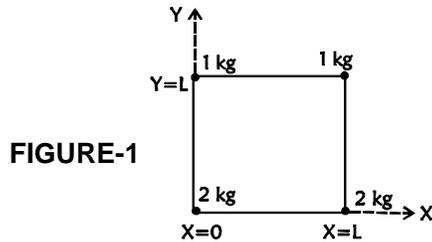
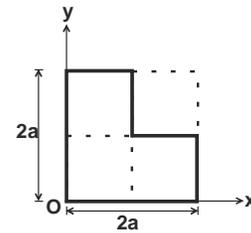


FIGURE - 2



12. Define moment of inertia. State the factors on which it depends. 2
13. What is the torque of the force $\vec{F} = 2\hat{i} - 5\hat{j} + 4\hat{k}$ in N acting at the point $\vec{r} = 3\hat{i} + 3\hat{j} + 3\hat{k}$ in m about the origin? 2
14. The angle θ , covered by a body in rotational motion is given by the equation : $\theta = 6t + 5t^2 + 2t^3$. Determine the value of instantaneous angular velocity and angular acceleration at time $t = 2$ sec. 2
15. How will you distinguish a hard boiled egg from a raw egg by spinning each on a table top? 2
16. Prove that radius of gyration of a circular ring and circular disc of the same radius about an axis passing through their centres and perpendicular to their plane are in the ratio $\sqrt{2} : 1$? 3
17. The moment of inertia of a solid sphere about a tangent is $\frac{7}{5}mr^2$. Find the moment of inertia about a diameter? Find radius of gyration of the solid sphere. 3
18. A wheel is rotating at 900 rpm about its axis. If power is cut off. Then the wheel comes to rest in one minute. What is the angular acceleration? 3
19. A Disc of Radius R is cut from a larger Disc of Radius 2R in such a way that the edge of the hole touches the edge of the Disc. Locate the centre of mass of the residual Disc. 3
20. State and explain the principle of conservation of angular momentum. 3
21. A ring, a disc & a solid sphere start rolling from a rough incline. Arrange the time taken by them to reach ground in ascending order. 5