Answer on Question#56546 - Physics - Mechanics - Relativity

5-8 The density of a rod gradually decreases from one end to the other. It is pivoted at an end so that it can move about a vertical axis through the pivot. A horizontal force F is applied on the free end in the direction perpendicular to the rod. The quantities, that do not depend on which end of the rod is pivoted, are : (A) Angular acceleration (B) Angular velocity when the rod completes one rotation (C) Angular momentum when the rod completes one rotation (D) Torque of the applied force 5-9 A man stands in the middle of a rotating table which has an angular velocity ω. He is holding two equal masses at arms length in each hand. Without moving his arms he just drops the two masses away from the table. How will be the angular speed changed? (B) It will be less than ω (A) It will be greater than ω (C) It will not change (D) The increase or decrease will be decided by the quantity of the masses dropped. 5-10 If two circular discs of the same weight and thickness are made from metal of different densitie tiscs will have the larger moment of inertia about its central axis

Solution:

(A), (B) and (C) depend on the moment of inertia of the rod about one of its ends, which depend on which end it's pivoted. The only quantity that doesn't depend on it is the torque, since the force and the distance from the axis to the point to which it's applied is the same for both cases.

Answer: (D).

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