Think It Over

This section of *Resonance* presents thought-provoking questions, and discusses answers a few months later. Readers are invited to send new questions, solutions to old ones and comments, to 'Think It Over', *Resonance*, Indian Academy of Sciences, Bangalore 560 080. Items illustrating ideas and concepts will generally be chosen.

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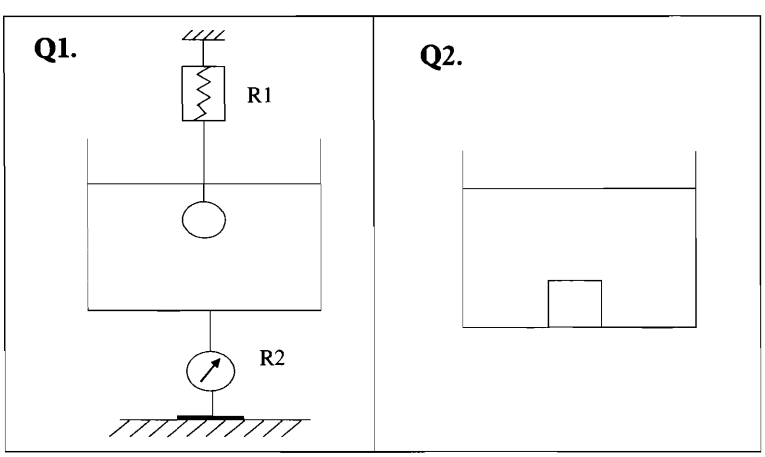
Floating and Immersed Bodies

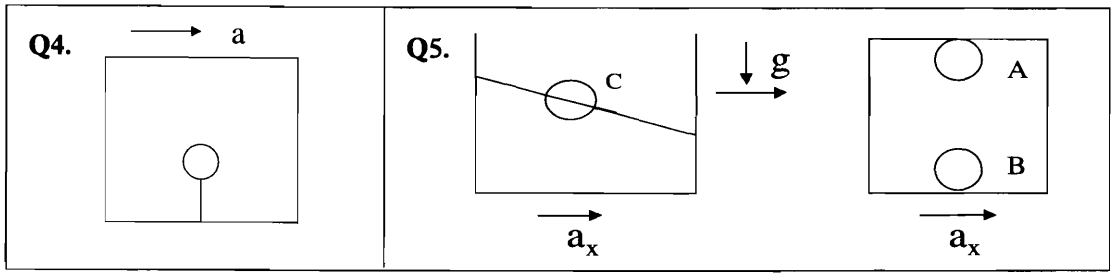
The problems given below are based on the article on p.28. The readers are invited to send the solutions. The first correct answer for each problem with clear explanation will be published.

Q1. A sphere of radius R and density ρ_s is immersed in liquid of density ρ_f. What are the readings R1 and R2 in the two weighing balances. Mass of tank plus water is M.

Q2. What is the buoyancy force on a block sitting at the bottom of a tank of water? Will it matter if the block is 'stuck' by glue to the bottom surface?



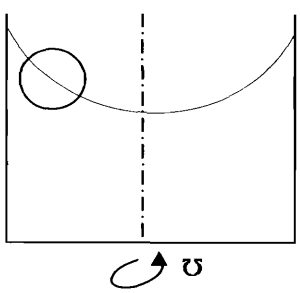
Keywords
Floating bodies, immersed bodies.



3. A stone from a boat is thrown into a small pool of water where the boat is floating. Does the water level rise, fall, or remain unchanged when the stone finally settles down to the bottom.

4. A closed box of air has a helium balloon attached with a string to the bottom wall. How much will the string tilt and in which direction when the box accelerates to the right?

Q6.



5. The fluid and container are accelerating to the right. What are equilibritum positions of spheres A, B, C in the cases shown in the figures. Note A, C are lighter than the fluid and B is heavier.

6. The interface of a liquid in a container set into rigid body rotation is described by a parabola. What will be the equilibrium position of a sphere floating on the liquid?

7. What is the force required to keep the semicircular gate in equilibrium?

8. The open end of an inverted container is pushed down into water. Calculate the force required to keep it in equilibrium as a function of depth.The container initially has air at atmosphere pressure.