

PROFESSOR: What now is required for an object to oscillate in a simple harmonic fashion?

Required is that the restoring force always opposes the displacement from equilibrium and that the restoring force is linearly proportional with that displacement. This is a necessary condition and it is a sufficient condition.

So the displacement from equilibrium, the restoring force must always oppose the displacement from equilibrium. If the displacement is in this direction, the force must be like this. If the displacement is in that direction, the force must be like this. And that force must be linearly proportional to the displacement from equilibrium. That is a sufficient and a necessary condition for an object to move in a simple harmonic fashion.