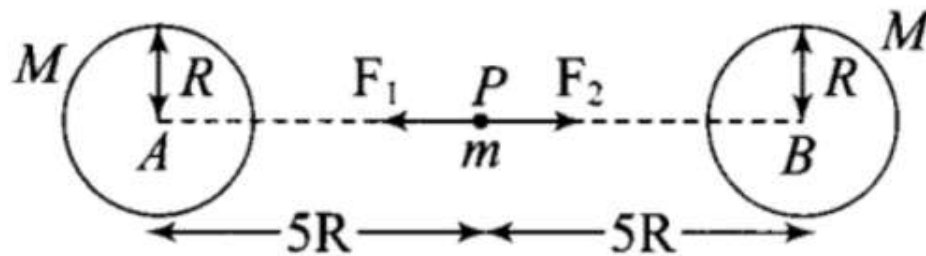


Q.06 Two identical heavy spheres are separated by a distance 10 times their radius. Will an object placed at the mid-point of the line joining their centres be in stable equilibrium or unstable equilibrium? Give reasons for your answer.

Sol: We have to displace the object through a small distance, to determine the nature of equilibrium from the middle point and then force will be calculated in a displaced position.

Let the mass and radius of each identical heavy sphere be M and R respectively. P is the midpoint of AB . An object of mass m is placed at the mid-point P of the line joining their centres.

The magnitude of force applied by each sphere on the object mass m is given by



$$F_1 = F_2 = \frac{GMm}{(5R)^2}$$

The direction of forces are opposite, therefore the resultant force acting on the object is zero. And the mass m is in stable condition.