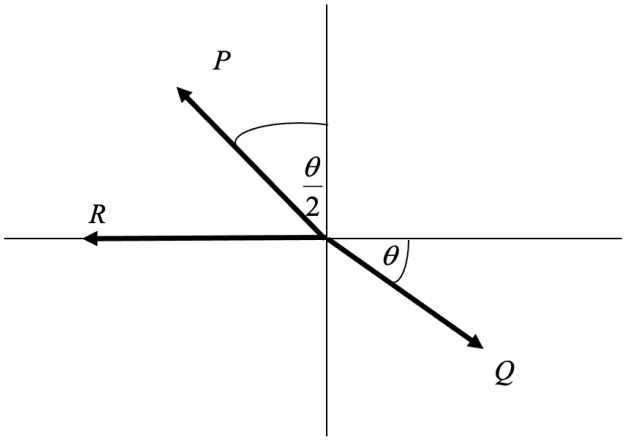
Question 8

Three coplanar forces of magnitudes *P*, *Q* and *R* newtons act on a particle that is in equilibrium as shown in the diagram below.



Then,

A. $P\sin\left(\frac{\theta}{2}\right)=Q\cos(\theta)$

B. $P\cos\left(\frac{\theta}{2}\right)+R=Q\sin(\theta)$

C. $P=Q\sin\left(\frac{\theta}{2}\right)$

D. $P=2Q\sin\left(\frac{\theta}{2}\right)$

E. $P+Q+R=0$

ANSWER D

resolving horizontally $P\sin\left(\frac{\theta}{2}\right)+R=Q\cos(\theta)$

resolving vertically $P\cos\left(\frac{\theta}{2}\right)=Q\sin(\theta)=2Q\sin\left(\frac{\theta}{2}\right)\cos\left(\frac{\theta}{2}\right)$

therefore $P=2Q\sin\left(\frac{\theta}{2}\right)$

