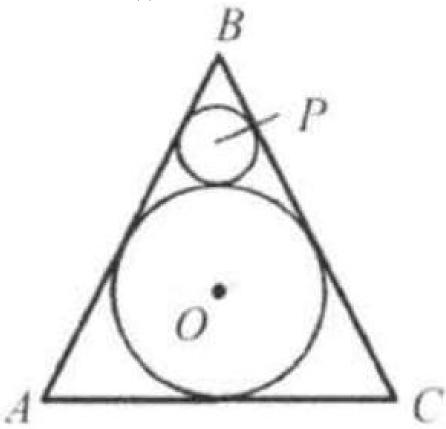
Problem

Circle O of radius 45 is inscribed in equilateral triangle ABC. Circle P is tangent to circle O and segments AB and BC. Find the area of circle P.

- (A) 245π
- (B) 625π
- (C) 225
- (D) 225π
- (E) 700



Solution

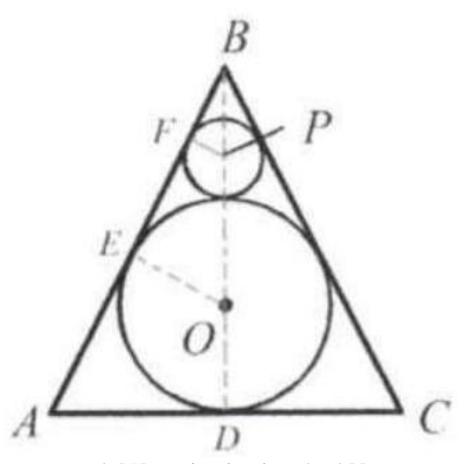
(D).

Draw $PF \perp \overrightarrow{AB}$ and $OE \perp AB$.

Connect BD.

Triangle BEO is a $30^\circ-60^\circ-90^\circ$ triangle and BO=2OE. OE=45 and BO=2OE=90, and BD=90+45=135.

Let PF = r.



Triangle BFP is a $30^{\circ}-60^{\circ}-90^{\circ}$ triangle and BP=2r. In other word, BP=BO-45-r. So $2r=BO-45-r \Rightarrow 3r=90-45=45$. So r=15. The area is $\pi(15)^2=225\pi$.