ME 274 – Spring 2026 - Quiz #2 Name SOLUTION

Problem Q1

Consider the path description for the motion of a point P. Circle the item below that most accurately describes the acceleration of P, $\vec{a}_P$:

(a) The rate of change of speed for P, $\dot{v}_P$, is ALWAYS the same as the magnitude of its acceleration, $|\vec{a}_P|$.

(b) The rate of change of speed for P, $\dot{v}_P$, is the same as the magnitude of its acceleration, $|\vec{a}_P|$ only if the path of P is STRAIGHT.

(c) The acceleration of point P is always PERPENDICULAR to the path of P.

(d) None of the above.

$\vec{a} = \dot{v}\hat{e}_t + \frac{v^2}{\rho}\hat{e}_n \Rightarrow |\vec{a}|^2 = \dot{v}^2 + \left(\frac{v^2}{\rho}\right)^2$

$\therefore$ $|\vec{a}| = |\dot{v}|$ if
- $v = 0$ OR
- $\rho = \infty$ (straight path)

Problem Q2

Point P represents a passenger traveling in a automobile. The velocity and acceleration of P, $\vec{v}_P$ and $\vec{a}_P$, respectively, are shown below at a given instant in time. Circle the item below that most accurately describes the motion of P:

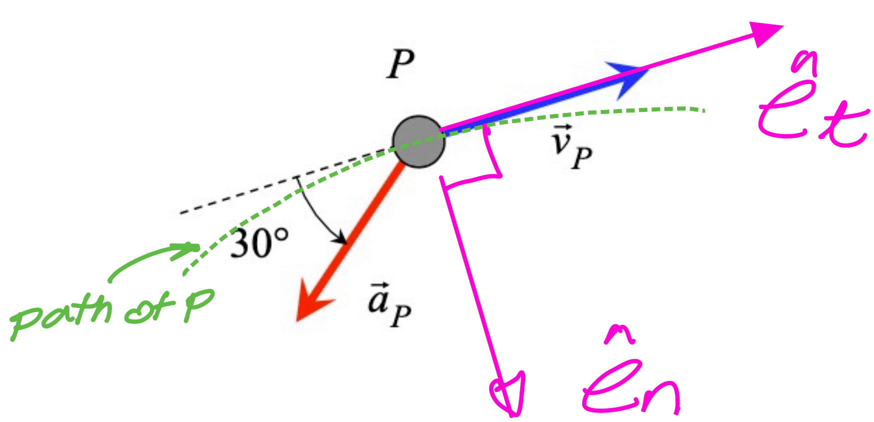
(a) The speed of P is decreasing and P is turning left.

(b) The speed of P is increasing and P is turning left.

(c) The speed of P is decreasing and P is turning right.

(d) The speed of P is increasing and P is turning right.

(e) There is insufficient information given for answering this question.



Since $\vec{a}_P$ opposes direction of $\vec{v}_P \Rightarrow$
$\dot{v}_P < 0 \Rightarrow$ decreasing speed