National University

of Computer & Emerging Sciences

Applied Physics (NS-1001) **Quiz # 2A** **Fall 2025**

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Section: BCS-A **CLO4** **Date: 17-09-2025**

Q.1: A motorist drives along a straight road at a constant speed of 15.0 m/s. Just as she passes a parked motorcycle police officer, the officer starts to accelerate at 2.00 m/s² to overtake her. Assuming the officer maintains this acceleration,(a) determine the time it takes the police officer to reach the motorist. Find (b) the speed and (c) the total displacement of the officer as he overtakes the motorist. (7M)

Solution:

$$\text{Distance traveled by motorist} = (15.0\ \text{m/s})t$$

$$\text{Distance traveled by policeman} = \frac{1}{2}(2.00\ \text{m/s}^2)t^2$$

(a) intercept occurs when $15.0t = t^2$, or $t = \boxed{15.0\ \text{s}}$

(b) $v(\text{officer}) = (2.00\ \text{m/s}^2)t = \boxed{30.0\ \text{m/s}}$

(c) $x(\text{officer}) = \frac{1}{2}(2.00\ \text{m/s}^2)t^2 = \boxed{225\ \text{m}}$