



# National University



of Computer & Emerging Sciences

Applied Physics (NS-1001)

Quiz # 2A

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Section: BCS-B

CLO4

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**Q.1:** The height of a helicopter above the ground is given by  $h=3.00t^3$ , where 'h' is in meters and 't' is in seconds. After 2.00 s, the helicopter releases a small mailbag. How long after its release does the mailbag reach the ground? (7M)

**Solution:**

$y = 3.00t^3$ : At  $t = 2.00$  s,  $y = 3.00(2.00)^3 = 24.0$  m and

$$v_y = \frac{dy}{dt} = 9.00t^2 = 36.0 \text{ m/s} \uparrow.$$

If the helicopter releases a small mailbag at this time, the equation of motion of the mailbag is

$$y_b = y_{bi} + v_i t - \frac{1}{2} g t^2 = 24.0 + 36.0t - \frac{1}{2}(9.80)t^2.$$

Setting  $y_b = 0$ ,

$$0 = 24.0 + 36.0t - 4.90t^2.$$

Solving for  $t$ , (only positive values of  $t$  count),  $t = 7.96$  s.