

الصفحة الالكترونية لمقررات
الفيزياء لكليات التقنية

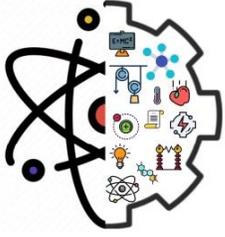
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Technical and Vocational Training Corporation



Chapter 4

Projectile Motion

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عناصر الوحدة

Projectile Motion Equations

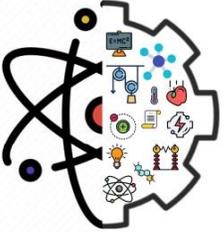
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Projectile Motion

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Examples

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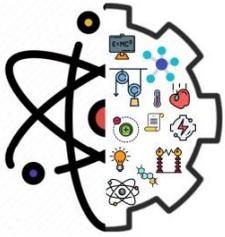
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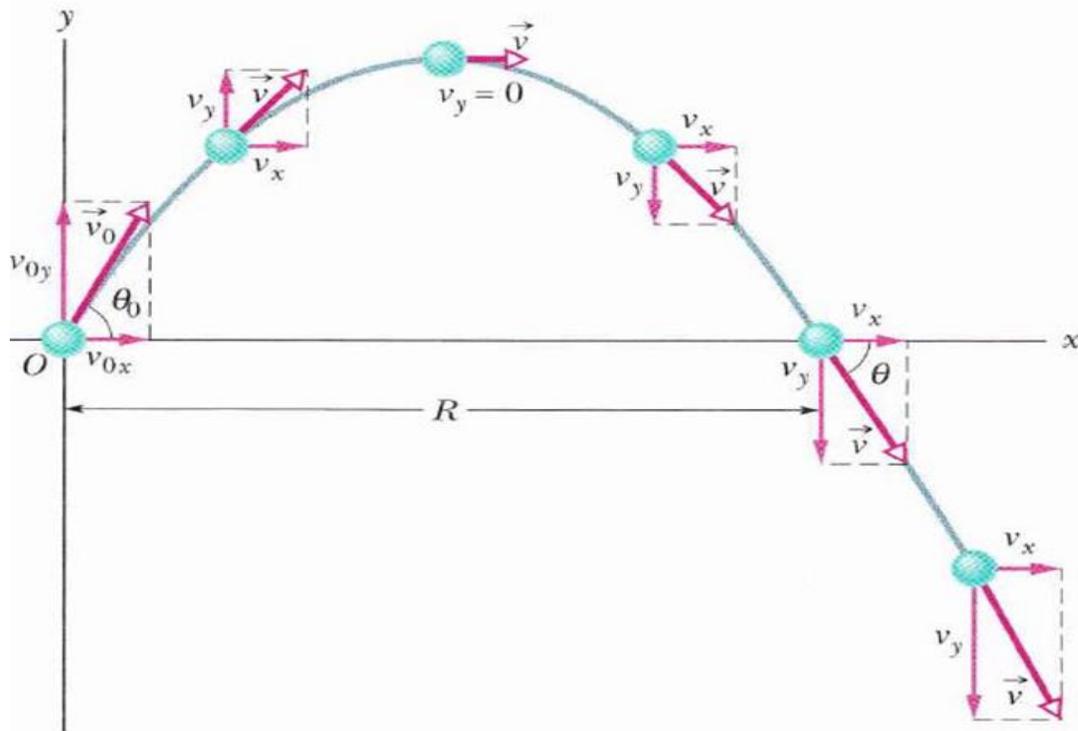
Projectile Motion

أولاً
01

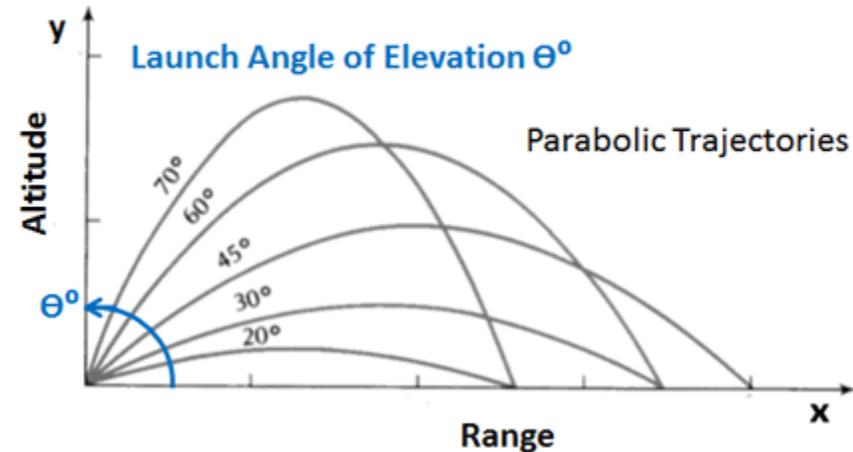


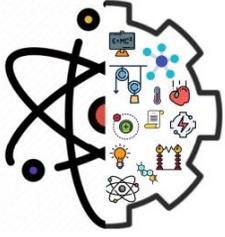
Projectile Motion:

Projectile motion is a form of motion where an object moves in a bilaterally symmetrical, parabolic path. The path that the object follows is called its trajectory. Projectile motion only occurs when there is one force applied at the beginning on the trajectory, after which the only interference is from gravity.



Range R vs Launch Angle θ for a Given Initial Velocity V_0





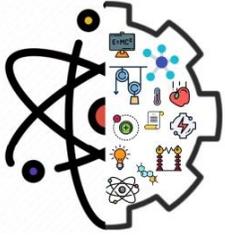
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Projectile Motion Equations

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Projectile Motion Equations:

1- The maximum height (Δy):

$$\Delta y = \frac{v_i^2 \sin^2 \theta}{2g}$$

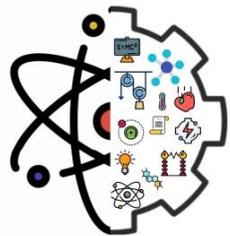
2- The horizontal range: (R or Δx):

$$R = \frac{v_i^2 \sin 2\theta}{g}$$

R is maximum when $\theta = 45^\circ$

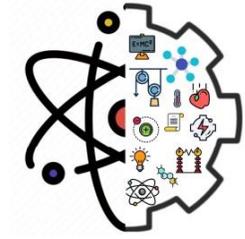
3- Total flight time:

$$t = \frac{2v_i \sin \theta}{g}$$



Examples

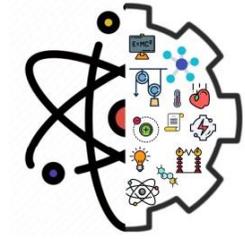
ثالثاً
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Example 1:

An object is launched at initial velocity of (20 m/s) in a direction making 25° with the horizontal.

- What the maximum height?
- What is the total flight time?
- What is the horizontal range?

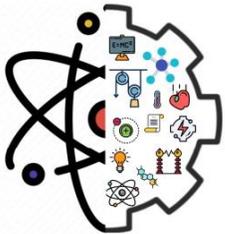


Example 2:

A pirate Ship (560m) from a fort defending a harbor entrance. A defense cannon located at sea level, fires balls at initial speed ($V_0 = 82 \text{ m/s}$).

- At what angle (θ) from the horizontal must a ball fired to hit the ship?
- What is the horizontal maximum range?

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Thank you