

O Level A Maths

Tutorial 15: Kinematics

Syllabus :

- Application of differentiation and integration to problems involving displacement, velocity and acceleration of a particle moving in a straight line
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1. A cyclist cycling at a velocity of 4 m/s grips his brakes gently. His velocity then follows the formula

$$v = 4 \exp(-t/10)$$

where t is time in seconds after gripping the brakes.

- Find the time it takes for his velocity to fall to 2 m/s.
- Find the acceleration at that point.
- What is the distance travelled from the time he grips the brakes.

2. A small stone hangs on a spring. It is pulled downwards by 1 cm and let go. The displacement from rest position is given by

$$x = A \cos 2\pi t$$

where t is time in seconds.

Find the following :

- amplitude,
- maximum velocity,
- maximum acceleration,
- period.