WJEC England Physics A-Level
Section 1.4 - Energy Concepts
Flashcards

Define work done.

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The energy transferred in moving an object. It is the product of the magnitude of the force and the distance moved in the direction of the force.

What is meant by the energy of a system?

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The amount of work the system can do.

Unit: Joules

The rate of work done or energy transfer is equal to...

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...power.

F$x$cos(θ) = ?

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The work done or the energy transferred.

F = force (N), x = distance moved (m),
θ = angle between the force and the line
of motion (° or rad)

What is efficiency?

What is efficiency?

Efficiency = The useful output power / Total input power

What is meant by friction?

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A resistance to motion between an object and a surface or an object moving through a fluid. Friction is a force that acts in the opposite direction to the movement.

Define kinetic energy and give the formula.

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The energy associated with the motion of an object with mass.

$$E_k = \tfrac{1}{2}mv^2$$

Define gravitational potential energy and state the formula.

Define gravitational potential energy and give the formula.

The energy stored in an object due to its position in a gravitational field.

$$E_p = mgh$$

Define elastic potential energy and give the formula.

Define elastic potential energy and give the formula.

The energy stored by an object as a result of a reversible change in its shape.

$$E_p = \tfrac{1}{2}kx^2$$

(where x is extension and k is the spring constant).

What is meant by the principle of conservation of energy?

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Energy cannot be created or destroyed, only transferred into other forms of energy.

Therefore the total energy in a closed system will always remain the same.

Define the work-energy relationship.

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$$Fx = \tfrac{1}{2}mv^2 - \tfrac{1}{2}mu^2$$

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Forces are perpendicular so use Pythagoras's theorem

$$(\text{Resultant force})^2 = 19^2 + 45^2$$

Resultant force = 48.84669897 N ≈ **49 N** (2s.f.)

Direction, $\tan\theta = 45/19$ $\theta = \tan^{-1}(45/19)$

θ = **67° above the horizontal**