

Efficiency and Sankey Diagrams

Edexcel International GCSE Physics · Energy

Efficiency describes the fraction of energy that is usefully converted.

Efficiency formula

Sankey diagram — toy electric car (label the 3 arrows)

Example

Calculation

Sankey diagram

Exam-style question

A wind-up toy robot has a clockwork spring inside. When it is wound up, energy is stored in the **elastic (strain) store** of the spring. When released, some of this energy is transferred to the **kinetic store** of the robot; the rest is transferred to the **thermal store** of the surroundings.

(a) State what is meant by the principle of conservation of energy. [1]

(b) The spring stores **200 J** of energy. When released, this is transferred to the robot's kinetic store with an **efficiency of 20%**.

(i) State the equation linking efficiency, useful energy output and total energy output. [1]

(ii) Calculate the energy transferred to the thermal store of the surroundings. [4]

energy = _____ J

(iii) Draw a labelled Sankey diagram for this energy transfer (use the space on the right). [3]

(c) The robot is wound up again. When released, **60 J** transfers to its kinetic store and the robot moves **4 m** during this transfer.

(i) State the useful work done on the robot. [1]

work done = _____ J

Sankey diagram & working