AQA Physics – Energy (Physics Paper 1)

Key Terms

Chemical Energy Stores	Includes fuels and foods. The energy is transferred during chemical reactions
Kinetic Energy Stores	Describes a moving object
Gravitational Energy Stores	Describes the energy an object has if it raised above the ground
Elastic Potential Energy	Describes the energy stored in a springy object when you stretch or squash it
Energy Transfer	Energy can not be created or destroyed only transformed from one form to another
Internal Store	Energy stored in the movement of particles. Combination of **kinetic energy** & **potential energy** of moving particles.
Joules	Unit of energy: One joule (1J) of work is done when a force of one Newton (1N) causes a displacement of (1M) 1 Joule – 1 Newton-metre
Friction	A contact force. Work to overcome this is mainly transferred to thermal energy
Closed System	No net change in the energy of a system
Work Done	Another way of describing energy transfer
Output Energy	The energy given out of a device (useful or wasted)
Input Energy	The energy supplied to a device
Non-renewable	A resource that cannot be replaced after it has been used
renewable	Resources that can replenish themselves

Non Renewable Energy Resources

Fossil Fuel – Oil, coal, gas	Used in industry & transport. Cheap to mine. Pumped out of the ground in pipes. Limited supply & gives of CO_2	
Nuclear Fuel	Nuclear fission. Small gives of lots of energy but doesn't give of CO_2. Expensive to run and waste is toxic (storage)	

Renewable Energy Resources

Biomass / Wood	Cheap *can be regrown*. Carbon neutral (giving off CO_2)	
Wave / tidal	Ideal for island countries (tidal barrage help flooding)	Construction is costly, environmental issues

Equations to Learn

Energy Transfer	Work Done = Force applied x Distance moved (J)/ (N/m) = (N) x (m)	Equation Number 2: $W = F\ s$
Kinetic Energy	Kinetic energy = ½ x mass x (speed)^2 (J) = (0.5) x (kg) x (m/s)^2	Equation Number 10: $E_k = ½\ m\ v^2$
Gravitational Potential Energy	GPE = mass x gravitational field strength x height (J) = (kg) x (N/kg) x (m)	Equation Number 11: $(\Delta)E_p = m\ g\ (\Delta)h$
	GPE = weight x change of height (J) = (N) x (m)	
Hookes Law: Spring Const.	Force on spring = Spring Constant x Extension (N) = (N/m) x (m)	Equation Number 3: $F = k\ e$
Efficiency	Efficiency = useful output ÷ total input (x 100) (%) = (J) ÷ (J) (x 100)	Equation Number 14:
	Efficiency=useful power in÷total power out(x 100) (%) = (W) ÷ (W) (x 100)	Equation Number 15:
Power	Power = Energy Transferred ÷ Time (W) = (J) ÷ (s)	Equation Number 12+13: $P = E \div t$

Equations given on the Equation Sheet

Elastic Potential	Elastic energy = ½ x spring constant x (extension)^2 (J) = (0.5) x (N/m) x (m)^2	$Ee = ½\ k\ e^2$
Specific Heat Capacity	Energy = mass x SHC x temperature change (J) = (kg) x (J/kg °C) x (°C)	$\Delta E = m\ c\ \Delta\Theta$

Renewable Energy Resources

Solar	From Sunlight → infinite energy. Panels can be put on houses	Can be costly to manufacture and maintain
Wind	Usually placed on hills (in wind farms) → potentially infinite	Manufacture and Implementation can be costly and can be an eyesore
Geothermal	Heat from Earth in volcanic regions used to heat water	Product from ground may contain dangerous elements
Hydroelectric	Energy harnessed from GPE → KE of water. Can create reservoirs	Costly to build, can cause large scale flooding and effect local ecology

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