Chapter 6. Energy stores and transfers

1. Energy

Unit: ( )

Is energy a **scalar or vector? ( )**

2. Energy stores

Gravitational potential energy(g.p.e.):( )

Kinetic energy(k.e.): ( )

Elastic energy; Internal energy; Chemical energy; Nuclear energy; Electrical energy

3. Energy transfers

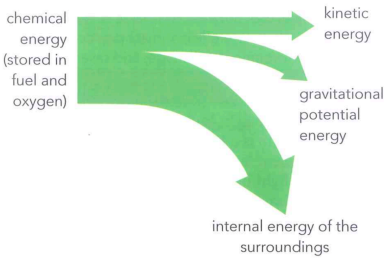
Doing work(W); Heat; Light(Electromagnetic radiation, e.g. Sun); Electrical current

4. **Energy conservation:**

( )

Sankey diagram:

A flow of diagram representing energy conservation. Arrow width proportional to energy. Total width remains constant



Dissipated (Energy loss): energy that is spread out is not useful; usually through: ( )

Efficiency = ( )

常考点:

• **能量转换**：看看物体**状态**发生了什么**变化**，对应什么**能量**改变

e.g. **h** => g.p.e.) ; **v** =>k.e.; change size/shape => elastic energy; T => internal/thermal; nuclear reaction =>nuclear energy; chemical reaction => chemical energy

hydro-electricity(dam, tidal power station): g.p.e => k.e. => electrical energy

a.c. generator: k.e. => electrical

motor: electrical => k.e.

Nuclear power station: nuclear => heat => k.e. => electrical

- **能量守恒:**

e.g. bouncing ball (can not return to original height due to energy loss)

Falling: ( ) => k.e. + heat(internal)

Bouncing: energy loss(heat, sound)

Bouncing back: ( ) => ( ) + heat(internal)

Chapter 7. Energy Resources

Energy resource	Source	From sun / not	Energy forms	Renewable /not	reliable/ not	Use steam/ not
Solar	the Sun					
Wind	wind					
Wave	water					
Hydroelectric	water					
Boimass	biomass					
Fossil	oil gas coal					
Nuclear	Uranium					
Geothermal	the Earth					
Tidal	water					

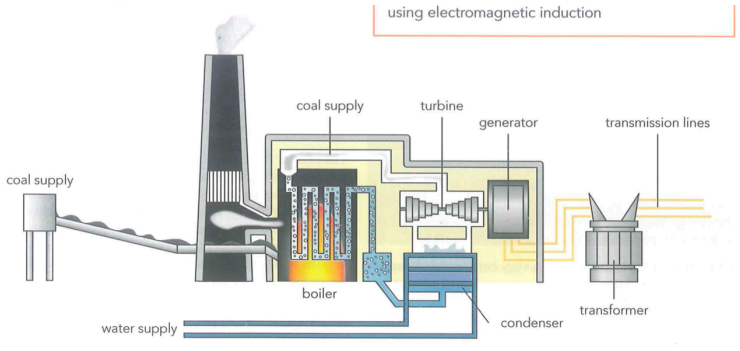
Non-renewables: (_____)

Renewable (def): ( )

Not from the Sun: (_____)

Sun's energy comes from_____ (splitting heavy nucleus into 2/3 nuclei) in the Sun's core vs_____(fuse light nuclei into heavy nucleus) used in nuclear power station.

Energy resources to **generate electricity**:



Boiler

↓

( )

↓

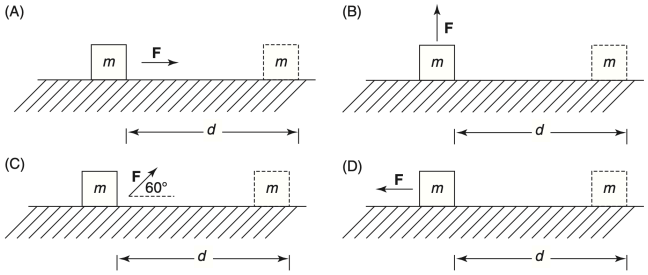
( )

Chapter 8. Work & Power

1. Work =

2. Work =

Unit:



a. 判断做功与否: 力的方向上是否有运动距离

b. work done = energy transfer 从转移能量多少

   判断做功多少

c. useful work： 增加的useful energy，e.g. raise an object from ground to 5m high: useful work W = mgh = ΔE_p; e.g. push an object from 1m/s to 5m/s: useful work W = ΔE_k

d. 物体下落：g.p.e -> k.e.

e. Work against gravity/friction

物体在竖直向上拉力F下缓慢上升，g.p.e increases
work done by gravity 重力做负功：W = -mgh (< 0)
Work against gravity F 抵抗重力做正功：W = mgh (>0)

物体在水平推力F下加速, 运动s米，e.k. increases
work done by friction 摩擦力做负功：W = -fs (< 0)
Work against gravity F 抵抗重力做正功：W = fs (>0)

3. power =

Unit:

4. percentage efficiency =