**Revision tasks for energy and electricity – Year 9 Physics Self Study**

**Task 1: Watch free Science lessons and/or visit BBC Bitesize and do mind maps for the following subtopics**

* GCSE Science Physics – Energy stores and transfers

<https://www.freesciencelessons.co.uk/gcse-physics-paper-1/energy/>

<https://www.bbc.co.uk/bitesize/guides/z8hsrwx/revision/1>

* GCSE Science Physics – Work, Power and Efficiency

<https://www.bbc.co.uk/bitesize/guides/zp8jtv4/revision/1>

* GCSE Science Physics – Energy and heating

<https://www.bbc.co.uk/bitesize/guides/z2gjtv4/revision/1>

* GCSE Science Physics – Electric circuits (circuit symbols, current, potential difference and resistance, series and parallel circuits)

<https://www.freesciencelessons.co.uk/gcse-physics-paper-1/electricity/>

<https://www.bbc.co.uk/bitesize/guides/zpdtv9q/revision/1>

* GCSE Science Physics – Mains electricity (AC and DC current, plugs, power and national grid)

<https://www.bbc.co.uk/bitesize/guides/z3xv97h/revision/1>

**Task 2: Answer these Energy topic questions using the facts included in the mind maps and the previous revision notes on equations and required practicals:**

1. Write down 5 energy stores and 3 energy transfers.
2. Complete the following sentence about energy

Energy cannot be c\_\_\_\_\_\_\_\_\_\_\_\_\_ or destroyed but can be t\_\_\_\_\_\_\_\_\_\_\_\_, stored or dissipated.

1. Write down the equations to calculate the kinetic energy and gravitational potential energy
2. Complete the following sentence with the correct energy stores

As a cyclist accelerates, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy store in the cyclist’s body decreases and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy of the cyclist increases.

1. Write down the equations to calculate power and work done
2. What are the units for energy and power?
3. Which equation is used to calculate efficiency?
4. Write down examples of non-renewable and renewable energy sources

**Task 3: Answer these Electricity topic questions using the facts included in the mind maps and the previous revision notes on equations and required practicals:**

1. What is current? Write down the equation to **calculate current** using charge and time. What is the **unit** of current? What do we use to **measure** current?
2. Write down the equation to **calculate potential difference (voltage)** using energy and charge. What is the **unit** of voltage? What do we use to **measure** voltage?
3. Write down the equation used to calculate resistance. What is the **unit** of resistance?
4. Write down the differences between a series circuit and parallel circuit
5. Fill in the blanks using the words current or potential difference

In a series circuit, \_\_\_\_\_\_\_\_\_\_\_\_\_ stays the same all around the circuit but the \_\_\_\_\_\_\_\_\_\_ is shared among the different components. In a parallel circuit, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ stays the same across each branch but the \_\_\_\_\_\_\_\_\_\_\_ is shared among the branches.

1. Draw the current/potential difference graphs for a resistor, filament lamp and diode
2. Explain how the resistance of a thermistor changes with temperature.
3. Explain how the resistance of a LDR changes with the light intensity.
4. What is a frequency and voltage of mains electricity? Is it AC or DC?
5. What is the national grid?

**Task 4: Experimental investigation**

1. A student wants to investigate how the current through a filament lamp affects its resistance.

(a)     Use the circuit symbols in the boxes to draw a circuit diagram that she could use.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **12 V battery** | **variable resistor** | **filament lamp** | **voltmeter** | **ammeter** |
|  |  |  |  |  |

**(2)**

(b)     Describe how the student could use her circuit to investigate how the current through a filament lamp affects its resistance. (4 marks)

2. You have been asked to find out the best material for insulating a hot water tank. You have three materials: aluminium foil, cotton wool and expanded polystyrene. Describe an experiment to compare the effectiveness of these materials.

Include in your description the way you would use your results to decide the most effective material. (6 marks)

**Task 5: Extended answer question**

State and explain the advantages and disadvantages of using nuclear power stations to produce electricity (5 marks)

**Task 6: Extended writing with research**

Research and write about how fossil fuels contribute to climate change.