# Task 1 - SI Prefixes

Sometimes in engineering measurements are too big or too small to be measured using the base unit, so we use multiples and submultiples of 10 (10 being the number base of SI). These are known as prefixes, which are shown in front of the base unit, and are given special names. Some examples are given below. Please complete the missing terms and add new prefixes and symbols to this table as you encounter them.

**Prefix Symbol Factor Multiplication**

Terra

**Giga**

**Mega**

**Kilo K 103 1,000**

Hecto

**milli m 10-3 0.001**

**micro**

**nano**

In engineering we use SI units, for instance length is measured in metres. Complete the table below using the appropriate SI units (i.e. give the number of metres in a mile in the first row).

|  |  |  |
| --- | --- | --- |
| **Name** | **Unit symbol** | **Value in appropriate SI Units** |
| mile | m |  |
| inch | ins |  |
| foot | ft |  |
| yard | yd |  |
| minute | min |  |
| hour | h |  |
| degree | ° |  |
| tonne | t |  |
| degree Celcius | °C |  |
| degree Fahrenheit | °F |  |
| standard atmosphere | atm |  |
| bar | bar |  |
|  |  |  |

Please complete the third column in the table below, giving the SI unit for each of the terms (i.e. time is measured in seconds).

|  |  |  |
| --- | --- | --- |
| **TERM** | **SYMBOL** | **SI UNITS** |
| Time | t |  |
| Mass | m |  |
| Temperature | T |  |
| Linear Displacement | s, L, d, h, x, y |  |
| Linear Velocity | u, v, |  |
| Linear Acceleration (Gravitational) | a (g) |  |
| Angular Displacement | θ |  |
| Angular Velocity | ω |  |
| Angular Acceleration | α |  |
| Pi | π |  |
| Diameter | D,d, Ø |  |
| Radius | R, r |  |
| Area | A |  |
| Volume | V |  |
| Density | ρ |  |
| Coefficient of Friction | μ |  |
| Force | F |  |
| Work Done | W |  |
| Energy | E/Q |  |
| Power | P |  |
| Momentum | M |  |
| Impulse | I |  |
| Moments | M |  |
| Torque | T |  |
| Moment of Inertia | I |  |
| Pressure | P |  |
| Stress (T/C) | σ |  |
| Shear Stress | τ |  |
| Strain (T/C) | ε |  |
| Shear Strain | Ø |  |
| Young’s Modulus | E |  |
| Shear Modulus | G |  |
| Specific Heat Capacity | c |  |
| Change in | δ, Δ |  |
| Sum of | Σ |  |

Please complete the table below, giving the symbol for each of the terms. Add new terms, units, symbols & formulae to this table as you encounter them.

|  |  |
| --- | --- |
| **Term** | **Symbol** |
| force |  |
| mass |  |
| acceleration |  |
| weight |  |
| mass |  |
| gravitational acceleration |  |

# Task 2 - Circuit Symbols

In electronics we use circuit symbols to represent different components. Write the correct term/name for each of the symbols below.

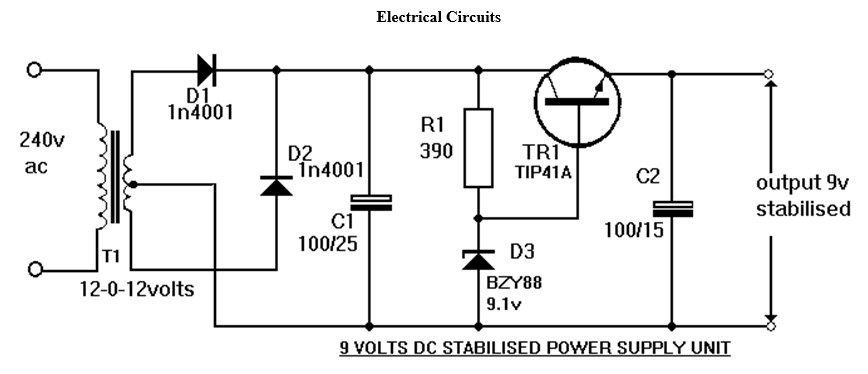
Please complete the tables below and on the next page using the Internet for research. You will need to obtain images of the circuit symbols and then provide the functions of the components.

|  |  |  |
| --- | --- | --- |
| **Resistors** | | |
| **Component** | **Component  Picture** | **Function of Component** |
| Resistor |  | A resistor restricts the flow of current, for example to limit the current passing through an LED. |
| Variable Resistor  (Rheostat) |  |  |
| Variable Resistor  (Potentiometer) |  |  |
| Variable Resistor  (Preset) |  |  |

|  |  |  |
| --- | --- | --- |
| Capacitors | | |
| **Component** | **Component  Picture** | **Function of Component** |
| Capacitor |  |  |
| Capacitor  polarised |  |  |
| Variable Capacitor |  |  |
| Trimmer Capacitor |  |  |

Add new components to these tables as you encounter them.

Now identify each symbol for the electric circuit shown below, annotating the names on the diagram.



# Task 3

Identify the major parts of the lathe machine by annotating it e.g. chuck, tail stoke etc.



# Task 4

# 

Identify the major parts of the milling machine shown below by annotating it e.g. milling machine head etc.



# Task 5

# 

Identify the major parts of the drilling machine shown below by annotating it e.g. drilling machine head etc.



**Task 6**

Make a list of fasteners, with images and descriptions of each of them, generally used for engineering products and structures. See the example shown below. These fasteners are used for designing engineering components.

### Hex Head Bolts

### Machine Screws

### Socket Cap Screws

### Hex Nuts

### Square Nuts

### POP Rivets

### Dowel Pins

Stud

Plain Washer



Spring Washer - Spring washers are used to prevent nuts, bolts and screws from vibrating loose. These washers are rings, which are split at one point and bent into a helical shape.

# Task 7

Working effectively and safely in an engineering workshop.

Health and Safety is a vital part of an engineering course. Complying with legislation is a requirement for all students and staff. Please complete the table below. You will need to identify the potential hazards to each part of the body listed and give examples of the PPE used for protection.

|  |  |  |
| --- | --- | --- |
| **Part of the body** | **Hazard** | **PPE** |
| Head |  |  |
| Eyes |  |  |
| Hearing |  |  |
| Lungs |  |  |
| Hands |  |  |
| Feet |  |  |
| Skin |  |  |
| Trunk and body |  |  |
| Whole body |  |  |

Please complete this document and make sure you bring it with you on your first day at college.