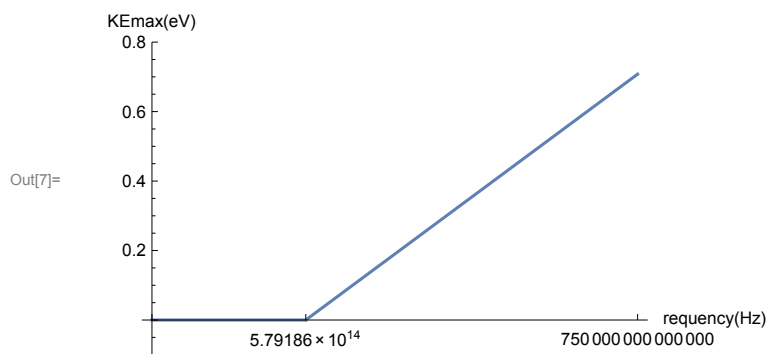


## Problem set 2

1 (a)

```
In[1]:= c = 3 × 108;
        h =  $\frac{6.63 \times 10^{-34}}{1.6 \times 10^{-19}}$ ;
        W = 2.4;
        fmin = c 109 / 600;
        fmax = c 109 / 400;
        f0 = W / h;
        Plot[Piecewise[{{h f - W, f > f0}, {0, f < f0}}, {f, fmin, fmax},
        PlotRange → {-0.1, 0.8}, AxesLabel → {"frequency (Hz)", "KEmax (eV)"},
        Ticks → {{fmin, f0, fmax}, Automatic}]
```



(b) Increasing the power of the light will not change the maximum kinetic energy of the photoelectrons. Hence the plot will be the same.

2.

```
In[8]:= v = {x3, x3, x3};
        Integrate[Div[v, {x, y, z}], {x, -a, a}, {y, -a, a}, {z, -a, a}]
        (* left hand side of divergence theorem *)
        Integrate[v.{0, 0, 1}, {x, -a, a}, {y, -a, a}] +
        Integrate[v.{0, 0, -1}, {x, -a, a}, {y, -a, a}] +
        Integrate[v.{0, 1, 0}, {x, -a, a}, {z, -a, a}] +
        Integrate[v.{0, -1, 0}, {x, -a, a}, {z, -a, a}] +
        Integrate[v.{1, 0, 0} /. x → a, {y, -a, a}, {z, -a, a}] +
        Integrate[v.{-1, 0, 0} /. x → -a, {y, -a, a}, {z, -a, a}]
        (*right hand side of divergence theorem*)
```

Out[9]=  $8 a^5$

Out[10]=  $8 a^5$