We order the functions as follows.

- g_1 comes before g_5. This is like the solved exercise in which we saw $2^{\sqrt{\log n}}$. If we take logarithms, we are comparing $\sqrt{\log n}$ to $\log n + \log(\log n) \geq \log n$; changing variables via $z = \log n$, this is $\sqrt{z} = z^{1/2}$ versus $z + \log z \geq z$.

- g_5 comes before g_3, since $(\log n)^3$ grows faster than $\log n$. (They're both polynomials in $\log n$, but $(\log n)^3$ has the larger degree.)

- g_3 comes before g_4: Dividing both by n, we are comparing $(\log n)^3$ with $n^{1/3}$, or (taking cube roots), $\log n$ with $n^{1/9}$. Now we use the fact that logarithms grow slower than exponentials.

- g_4 comes before g_2, since polynomials grow slower than exponentials.

- g_2 comes before g_7: Taking logarithms, we are comparing n to n^2, and n^2 is the polynomial of larger degree.

- g_7 comes before g_6: Taking logarithms, we are comparing n^2 to 2^n, and polynomials grow slower than exponentials.

[1] ex413.866.86