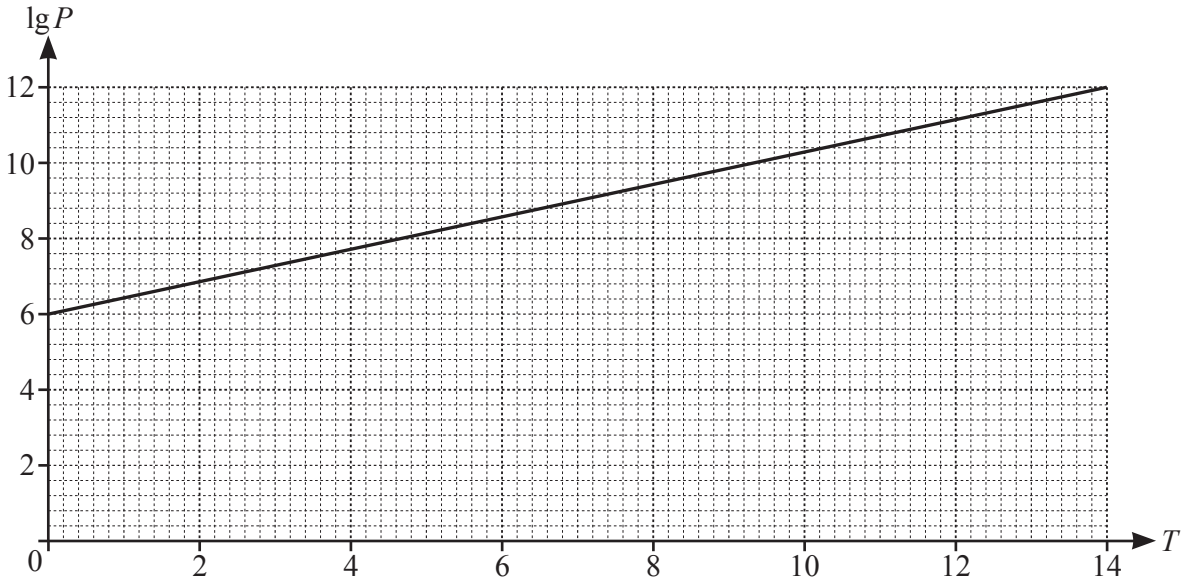
5 Variables P and T are known to be connected by the relationship $P = Ab^T$, where A and b are constants. Values of P are found for certain values of time, T.

(a) Show that a graph of $\lg P$ against T will be a straight line. [2]

(b)



The diagram shows the graph of $\lg P$ against T. The graph passes through (0, 6) and (14, 12). Find the values of A and b. [4]

(c) Using the graph or otherwise, find the length of time for which P is between 100 million and 1000 million. [3]

6 **(a)** **(i)** Find the first three terms in the expansion of $\left(1+\frac{x}{7}\right)^5$, in ascending powers of x. Simplify the coefficient of each term. [2]

(ii) The expansion of $7(1+x)^n\left(1+\frac{x}{7}\right)^5$, where n is a positive integer, is written in ascending powers of x. The first two terms in the expansion are $7+89x$. Find the value of n. [2]

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