

**Question 1** [10]

Consider the following function:  $f(t) = 10te^{-5t}$ , for  $t > 0$ .

(i) Briefly explain in words what happens at small values of  $t$ , then at large values of  $t$ .

(ii) Calculate the derivative of  $f(t)$  with respect to  $t$ :  $f'(t)$ .

(iii) Compute the value of  $t$  that satisfies the equation:  $f'(t) = 0$  and then compute  $f(t)$  for this value of  $t$ . Give your answers below.

(iv) Hence, sketch a graph of  $f(t)$ .