

A sound wave can be modelled using a function  $P(t) = k \sin at$ , where  $P$  is air pressure in Pascals,  $t$  is time in milliseconds (ms) and  $k$  and  $a$  are constants.

- (a) Write the equation for a sound wave  $P_1(t)$  that has an amplitude of 2 Pascals and a period of 5 ms.

## Tips

- 1. Know what the amplitude tells you:** The amplitude is the number in front of the sine function. If the amplitude is 2 Pascals, then the coefficient ( $k$ ) must be 2.
- 2. Use the period to find the frequency constant:** The period is the time it takes for one full wave cycle. Use the rule: frequency constant ( $a$ ) =  $2\pi$  divided by the period (in milliseconds). This value replaces "a" in the equation.
- 3. Substitute both values into the model:** Once you know the amplitude ( $k = 2$ ) and the frequency constant ( $a$ ), plug them into the standard form:  $P(t) = k \sin(at)$

[Link to NESA Marking Guidelines and Sample Answer](#)