

**Work, energy and power – A2 Further Mathematics Mechanics****1. June/2022/Paper\_7367/03M/No.2**

A car of mass 1200 kg is travelling at a constant speed of  $18 \text{ m s}^{-1}$  on a straight horizontal road.

The car experiences a total resistive force of 240 newtons.

Calculate the power of the car's engine.

Circle your answer.

[1 mark]

900 W

4320 W

16 000 W

21 600 W

## 2. June/2022/Paper\_7367/03M/No.5

A train of mass 10 000 kg is travelling at  $0.3 \text{ m s}^{-1}$  when it collides with a buffer. The buffer brings the train to rest.

As the buffer brings the train to rest it compresses by 0.2 metres.

When the buffer is compressed by a distance of  $x$  metres it exerts a force of magnitude  $F$  newtons, where

$$F = Ax + 9000x^2$$

where  $A$  is a constant.

- (a) Find, in terms of  $A$ , the work done in compressing the buffer by 0.2 metres.

[2 marks]

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- (b) Find the value of  $A$

[2 marks]

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