**Level 3 Diploma in Work-based Land-based Engineering Operations**

Unit 600 Task A: Use Calculations

(This task uses velocity, acceleration/deceleration & conversion)

**PROFORMA 7 TITLE: ACCELERATION DECELERATION**

**Introduction**

The dumper transmission described in Proforma 4 shown below has a three-speed gearbox.



The loaded dumper pulls away from a standstill in first gear, goes through second gear and into third gear accelerating to 12kph after eight seconds.

To manoeuvre safely round a corner, the machine has to slow down to 5kph in three seconds.

The formula used to calculate the acceleration/deceleration of velocity was demonstrated in the video during the presentation and is reproduced here:

$$a=\frac{v-u}{t}$$

Where:

*a* = acceleration (m/s2)

*v* = final velocity (m/s)

*u* = initial velocity (m/s)

*t* = time (seconds)

The difference between acceleration and deceleration is simply the same formula but you’ll end up with a negative answer as there is a decrease in velocity, not increase. (use “*d* = ” instead of “*a* = ” if you prefer.)

**Task**

Using the formula above, calculate the following rates of acceleration/deceleration:

A. The acceleration of the dumper from standstill to 12kph in 8 seconds.

B. The rate of deceleration to manoeuvre safely around the corner.

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