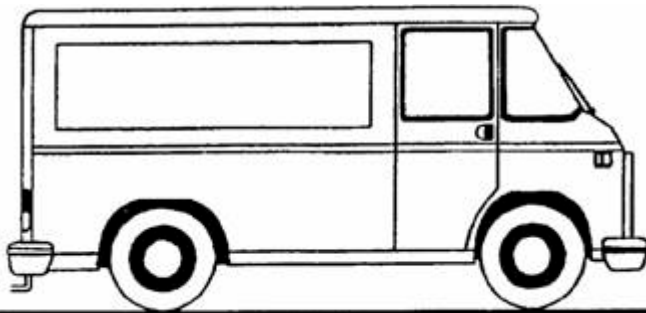


Speed/velocity/acceleration



Q2.

(a) The van shown above has a fault and leaks one drop of oil every second.

The diagram below shows the oil drops left on the road as the van moves from **W** to **Z**.



Describe the motion of the van as it moves from:

W to **X**

.....

X to **Y**

.....

Y to **Z**

.....

(3)

(b) The van was driven for 20 seconds at a speed of 30m/s.

Calculate the distance travelled.

.....

.....

.....

Distance m

(2)

(c) The van was travelling at 30m/s. It slowed to a stop in 12 seconds.

Calculate the van's acceleration.

.....

.....
.....

Acceleration m/s²

(3)

3) Q1. A high-speed train accelerates at a constant rate in a straight line. The velocity of the train increases from 30 m/s to 42 m/s in 60 seconds.

(a) (i) Calculate the acceleration of the train (3 marks)

.....
.....
.....
.....

M2. (a) WX deceleration / speed decreasing / slowing down / negative acceleration

XY constant speed / steady speed *not* constant motion / slow speed

YZ acceleration / speed increasing / speeding up
for 1 mark each

3

(b) distance = $v \times t$ **or** distance = 30×20
gains 1 mark

but

distance = 600(m)
gains 2 marks

2

(c) acceleration = v / t **or** acceleration = $30 / 12$
gains 1 mark
(if $-30 / 12$, allow negative sign here if not in the answer)

3

but

acceleration = 2.5 (m/s²)
gains 2 marks

but

acceleration = -2.5 (m/s²)
gains 3 marks

(d) in a crash / during hard braking car body stops / slows rapidly driver / passengers continue to move forward *not* thrown forward seatbelts provide backward force / keep them in their seats / restrain them to stop them hitting the windscreen / dashboard
(an alternative argument involving momentum is acceptable)
for 1 mark each

4

[12]

M3. (a) **B**

reason only scores if B is chosen

1

gradient / slope is the steepest / steeper
answers must be comparative
accept steepest line
ignore greatest speed

1

(b) (velocity includes) direction

'it' refers to velocity

1

[3]