Equations of Motion: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
21		14		15		19		18	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

Equations of Motion: Attempt #1

Total = 21 Marks

A car accelerates from rest at 15 $m \cdot s^{-2}$ for 2 s on a horizontal road.

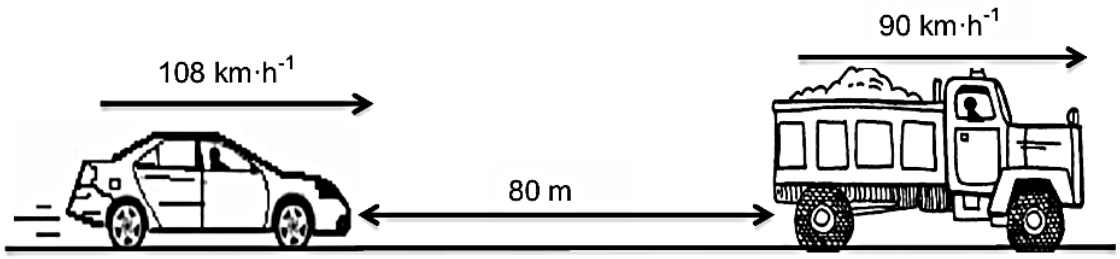
1. Define the term *acceleration.* (2)

2. Calculate the:

2.1 Distance covered by the car (3)

2.2 Velocity of the car (3)

While travelling at a constant velocity of 108 $km \cdot h^{-1}$, the driver of a car notices a sign warning motorists to keep a safe 2-second following distance. At that instant the car is 80 m behind a truck that is travelling at a constant velocity of 90 $km \cdot h^{-1}$.



3. Explain the meaning of a *safe 2-second following distance.* (2)

4. Calculate the safe 2-second following distance behind the truck. (6)

5. Calculate how long it will take the motorist to get to a safe 2-second following distance behind the truck. (5)

Equations of Motion: Attempt #2

Total = 14 Marks

Car **A** driving at 135 km.h^{-1} approaches a stationery car **B**. The driver of car **B** noticed that car **A** is approaching him at a very high speed. The driver of car **B** reacted suddenly by accelerating his car from rest at 1,5 m·s^{-2} for 11,5 s. After 11,5 s car **B** continued driving with a .

1. Convert 135 km.h^{-1} to m·s^{-1}. (2)
2. Determine the velocity of car **B** while trying to avoid car **A**. (4)
3. How far has car **B** driven after 11,5 seconds? (4)
4. The driver of car **A** suddenly hit the brakes and managed to stop after 40 m. What acceleration does car **A** experience to come to a standstill after 4 seconds? (4)

Equations of Motion: Attempt #3

Total = 15 Marks

A van is travelling at a constant speed of 54 km.h^{-1} in a straight and level road where the speed limit is 40 km.h^{-1}.

1. Define the term *acceleration.* (2)
2. Convert 54 km.h^{-1} to m.s^{-1}. (3)

A policeman starts his car from rest just as the van passes him. The police car accelerates uniformly at 2 m.s^{-2} until it reaches a maximum velocity of 20 m.s^{-1}.

3. Calculate the time **t** it takes the police car to reach its maximum velocity. (4)
4. Determine by calculation which vehicle (the van or the police car) is ahead at time **t** seconds (mentioned in QUESTION 3.3 above).

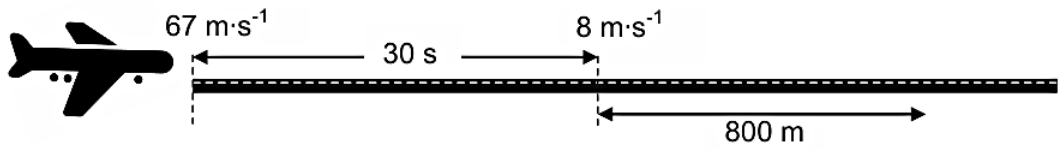
   Assume that the van maintains its constant speed. (6)

Equations of Motion: Attempt #4

Total = 19 Marks

An aeroplane touches down on a runway at a velocity of 67 $m \cdot s^{-1}$, as illustrated below. After 30 seconds the velocity of the aeroplane is 8 $m \cdot s^{-1}$.

The aeroplane then continues at a CONSTANT VELOCITY for a further 800 m before leaving the runway. The length of the runway is 2 000 m.



1. Define the term *vector*. (2)

2. Convert 67 $m \cdot s^{-1}$ to $km \cdot h^{-1}$. (1)

3. Calculate the:

3.1 Acceleration of the aeroplane during the first 30 seconds (4)

3.2 Distance travelled by the aeroplane during the first 30 seconds (4)

3.3 Time taken by the aeroplane to travel the 800 m (3)

3.4 Length of the runway NOT USED when the aeroplane leaves the runway (2)

4. Pilots should take weather conditions, such as wind and rain, into account when they calculate landing speed.

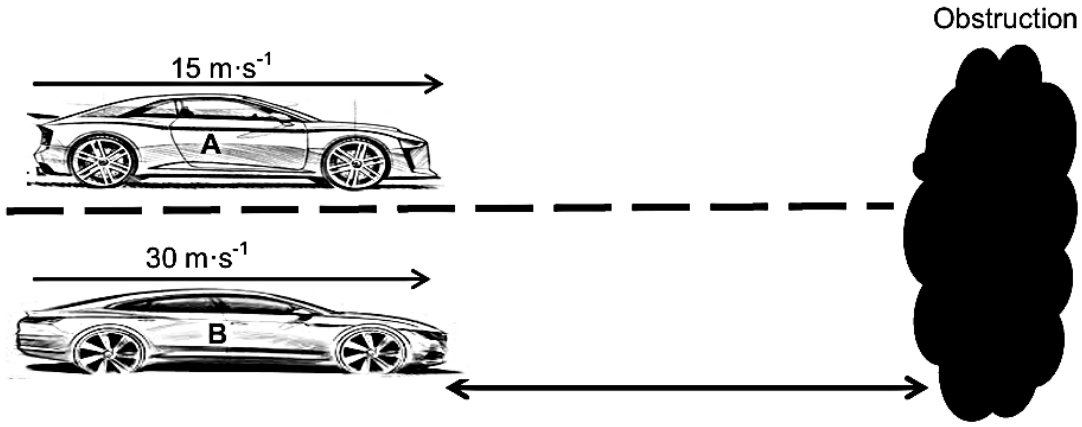
4.1 How should a pilot adapt the landing speed if the surface of the runway is wet? Choose from INCREASES, DECREASES or REMAINS THE SAME. (1)

4.2 Explain the answer to QUESTION 3.4.1 by referring to the stopping distance in relation to the landing speed. (2)

Equations of Motion: Attempt #5

Total = 18 Marks

Two cars, **A** and **B**, are moving at speeds of 15 $m \cdot s^{-1}$ and 30 $m \cdot s^{-1}$ in the same direction. They are side by side when both drivers observe an obstruction ahead of them, as shown in the diagram below.



Both drivers apply their brakes and accelerate at –4,5 $m \cdot s^{-2}$ until both cars come to rest. Ignore the reaction time of the drivers.

1. Define the term *acceleration* in words. (2)

2. Calculate the:

2.1 Time it takes car **A** to come to rest (4)

2.2 Stopping distance of car **A** (4)

3. Which car (**A** or **B**) has the longer stopping distance? Support the answer with a calculation. (6)

4. What conclusion can be made about the relationship between speed and stopping distance? (2)