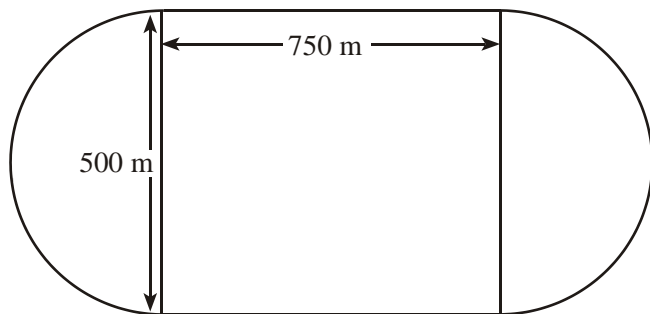


1. A race track is made up of a rectangular shape 750 m by 500 m with semi-circles at each end as shown in the diagram.



Michael drives around the track once at an average speed of 140 km h^{-1} .

- (a) Calculate the distance that Michael travels.
- (b) Calculate how long Michael takes in **seconds**.

(2)

(4)

(Total 6 marks)

2. Jenny has a circular cylinder with a lid. The cylinder has height 39 **cm** and diameter 65 **mm**.

- (a) Calculate the volume of the cylinder in **cm³**. Give your answer correct to **two** decimal places.

(3)

The cylinder is used for storing tennis balls.
Each ball has a **radius** of 3.25 cm.

- (b) Calculate how many balls Jenny can fit in the cylinder if it is filled to the top.
- (c) (i) Jenny fills the cylinder with the number of balls found in part (b) and puts the lid on. Calculate the volume of air inside the cylinder in the spaces between the tennis balls.
- (ii) Convert your answer to (c) (i) into cubic metres.

(1)

(4)

(Total 8 marks)

3. A field is 91.4 m long and 68.5 m wide.
- (a) Calculate the area of the field in m^2 .
 - (b) Calculate the area of the field in cm^2 .
 - (c) Express your answer to (b) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 6 marks)

4. (a) Convert 0.001673 litres to millilitres (ml). Give your answer to the nearest ml.

The SI unit for energy is Joules. An object with mass m travelling at speed v has energy given by $\frac{1}{2}mv^2$ (Joules).

- (b) Calculate the energy of a comet of mass 351 223 kg travelling at speed 176.334 m/sec. Give your answer correct to **six** significant figures.

In the SI system of units, distance is measured in metres (m), mass in kilograms (kg) and time in seconds (s). The momentum of an object is given by the mass of the object multiplied by its speed.

- (c) Write down the correct combination of SI units (m, kg, s) for momentum.

(Total 8 marks)

5. The speed of sound in air is given as 300 ms^{-1} .
- (a) How many metres does sound travel in air in one hour?
 - (b) Express your answer to part (a)
 - (i) correct to **two** significant figures;
 - (ii) in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 4 marks)