

Name:

Class:



A train begins a journey from a station and travels 60km in a time of 20 minutes.
What is the average speed of the train?

$$60 \text{ km} = 60\,000 \text{ m} \quad 20 \text{ mins} = 1200 \text{ s}$$

$$\text{Speed} = 60\,000 \div 1200$$

$$\text{Average speed} = \mathbf{50 \text{ m/s}}$$

In the space below draw the electrical symbol for a thermistor.



State **one** use of a thermistor.

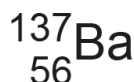
Home heating systems or fire alarm systems

Radioactive sources emit α -(alpha), β -(beta) and γ -(gamma) radiations.

i. State which of these types of radiation can pass through paper.

Beta and Gamma

ii. Barium-137 is a radioactive isotope. The nuclide notation for barium-137 is



Determine the number of neutrons in a nucleus of barium-137.

$$\text{Number of neutrons} = \mathbf{81}$$

iii. An isotope of barium-137 has a half-life of 3 minutes.

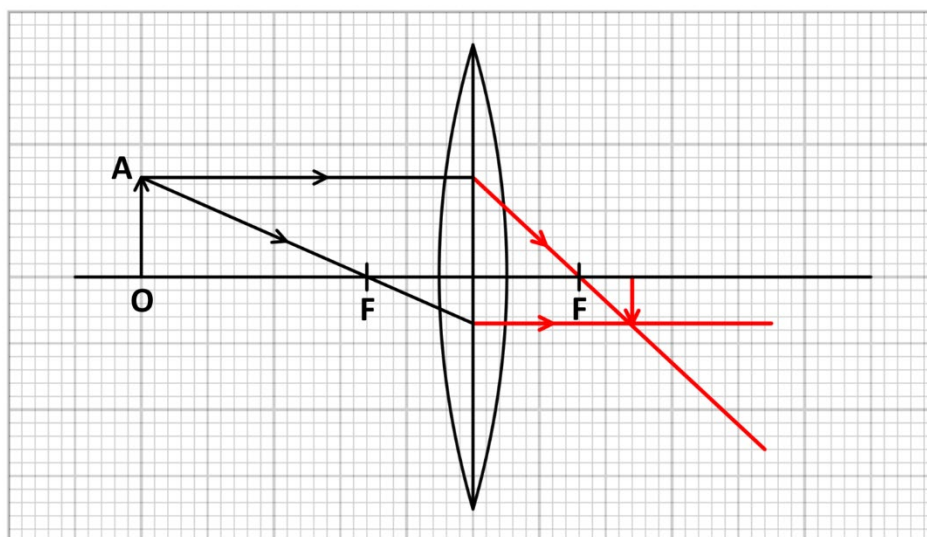
A radioactive source contains 36 mg of this isotope.

Calculate the mass of the isotope that remains in the source after 9 minutes.

$$36 \text{ mg} \times 0.5^3$$

$$\text{Mass} = \mathbf{4.5 \text{ mg}}$$

The figure below shows an object OB positioned 20 cm from a thin converging lens. Both focal points of the lens are labelled F.



Continue the paths of these two rays to show the position of the image of OB formed by the lens. **Draw an arrow** to show the **size**, **position** and **orientation** of the image of OB.