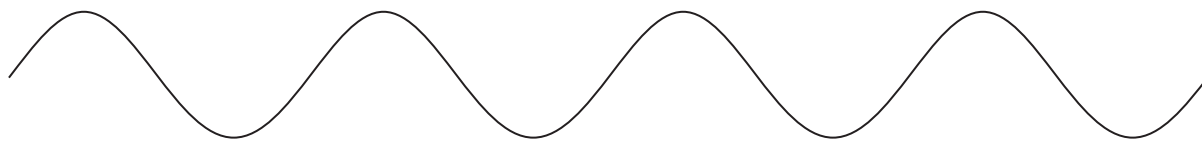


9 This question is about waves.

(a) The diagram represents a wave.



(i) Determine the amplitude of the wave by measuring it with a ruler.

(1)

amplitude = cm

(ii) Determine the wavelength of the wave by measuring it with a ruler.

(1)

wavelength = cm

(b) Microwaves are part of the electromagnetic spectrum.

(i) Name the part of the electromagnetic spectrum that has a lower frequency than microwaves.

(1)

(ii) Microwaves travel at a speed of 3.0×10^8 m/s in air.

A microwave has a wavelength of 2.7 cm.

Calculate the frequency of this microwave.

[wave speed = frequency \times wavelength]

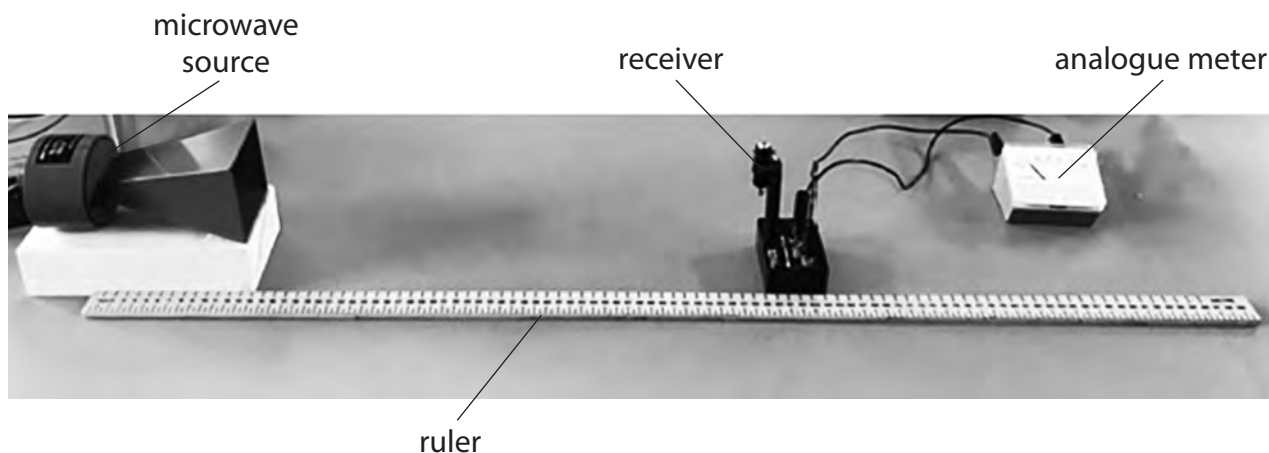
(3)

frequency = Hz



(c) A student uses a microwave source and a receiver to investigate microwaves.

Photograph 1 shows how the student sets up their apparatus.



Photograph 1

The meter shows the strength of the microwaves detected by the receiver.

The strength of the microwaves is measured in arbitrary units.

The student varies the distance between the microwave source and the receiver, and records the meter readings.

(i) Photograph 2 shows the analogue meter for one of the readings.



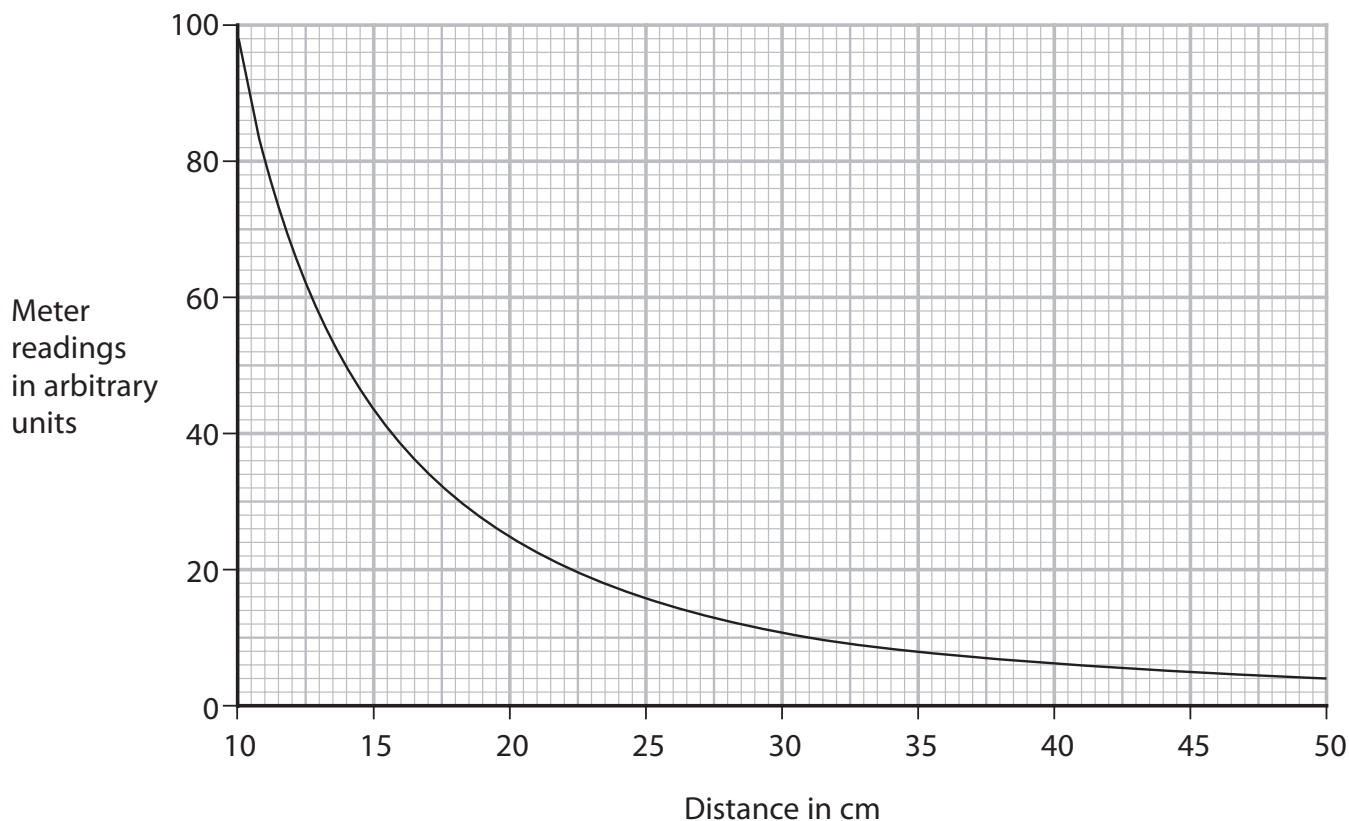
Photograph 2

Give the reading on the analogue meter.

(1)

reading = arbitrary units

(ii) The graph shows the results of the student's investigation.



The student concludes that the meter reading is inversely proportional to the distance between the microwave source and the receiver.

To be inversely proportional

$$\text{meter reading} \times \text{distance} = \text{constant}$$

Comment on the student's conclusion.

You should use data from the graph in your answer.

(4)

(Total for Question 9 = 11 marks)

