5 **(a)** By reference to the direction of propagation of energy, state what is meant by a transverse wave.

.....

..... [1]

(b) A space telescope is designed to detect electromagnetic radiation with wavelengths in the range 12 μm to 28 μm.

State the region of the electromagnetic spectrum for this radiation.

..... [1]

(c) A detector on another space telescope detects an electromagnetic wave. The signal from the detector is transmitted to Earth and displayed on an oscilloscope as shown in Fig. 5.1. The frequency of the signal displayed on the oscilloscope is equal to the frequency of the detected electromagnetic wave.

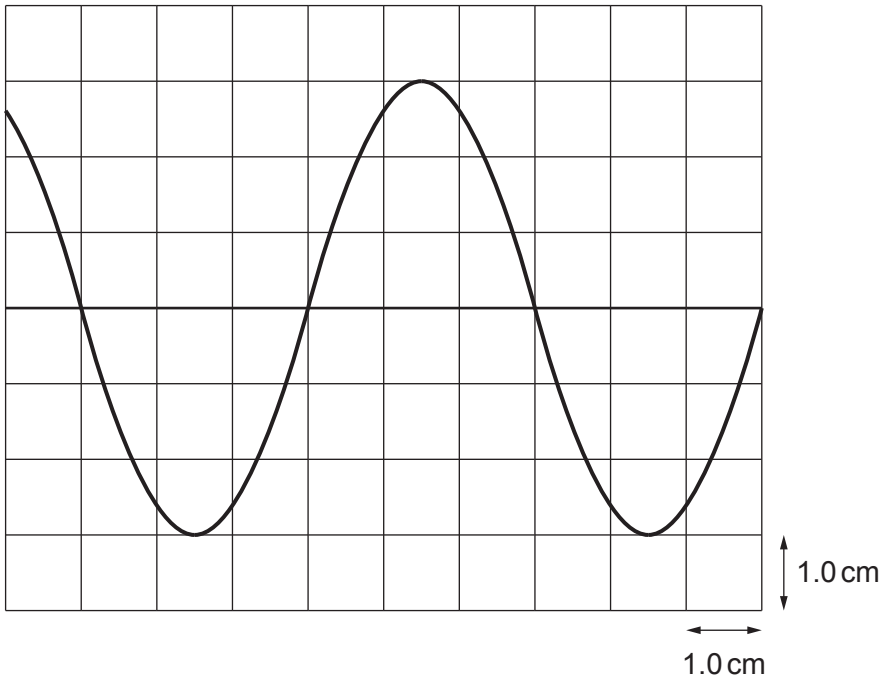

Fig. 5.1

The time-base setting on the oscilloscope is 5.0×10^{-15} s cm^{-1}.

Calculate the wavelength of the detected electromagnetic wave.

wavelength = ... m [3]

[Total: 5]