24 A vehicle carries a microwave transmitter that emits microwaves of a constant frequency. A stationary observer has a microwave receiver.

The vehicle moves directly towards the observer at constant speed. The observer detects microwaves of frequency F_o.

The vehicle then accelerates, still moving towards the observer, travels at higher steady speed for a time and then decelerates until it stops.

What is the variation in the frequency of the microwaves that are detected by the observer?

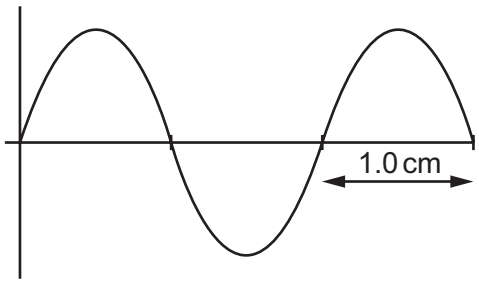
A The observed frequency will fall, then remain steady then return to the frequency F_o.

B The observed frequency will fall, then remain steady then rise to a higher frequency than F_o.

C The observed frequency will rise, then remain steady then fall to a lower frequency than F_o.

D The observed frequency will rise, then remain steady then return to the frequency F_o.

25 The diagram shows a cathode-ray oscilloscope display of an electromagnetic wave.



The time base setting is $0.20\,\mu s\,cm^{-1}$.

Which statement is correct?

A The frequency of the wave is 2.5 MHz and it lies in the microwave region of the electromagnetic spectrum.

B The frequency of the wave is 2.5 MHz and it lies in the radio-wave region of the electromagnetic spectrum.

C The frequency of the wave is 5.0 MHz and it lies in the microwave region of the electromagnetic spectrum.

D The frequency of the wave is 5.0 MHz and it lies in the radio-wave region of the electromagnetic spectrum.

26 In a double-slit interference experiment, light of frequency 6.0×10^{14} Hz is incident on a pair of slits. Bright fringes that are 3.0 mm apart are observed on a screen some distance away.

What is the separation of the bright fringes when the frequency of the light is changed to 5.0×10^{14} Hz?

A 1.8 mm **B** 2.5 mm **C** 3.0 mm **D** 3.6 mm