

- (b) Fig. 6.2 shows the central part of the fringe pattern on the screen at 1.5 m from the slits S_1 and S_2 which are 0.60 mm apart.

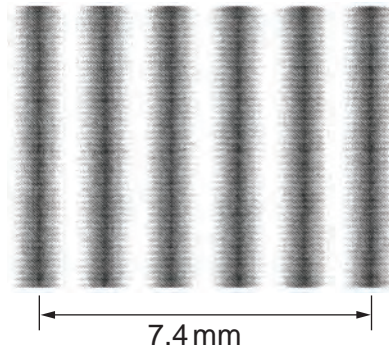


Fig. 6.2

Calculate

- (i) the fringe separation, that is, the separation x between adjacent dark lines

$x = \dots\dots\dots$ m [1]

- (ii) the wavelength λ of the yellow light.

$\lambda = \dots\dots\dots$ m [3]

- (c) One of the two slits is covered up. Describe and explain how the pattern of light on the screen is different from that of Fig. 6.2.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

3 (a) Name one common property of electromagnetic waves not shared by other waves.

..... [1]

(b) Fig. 5.1 shows a block diagram of the seven regions of the electromagnetic spectrum, labelled A to G.

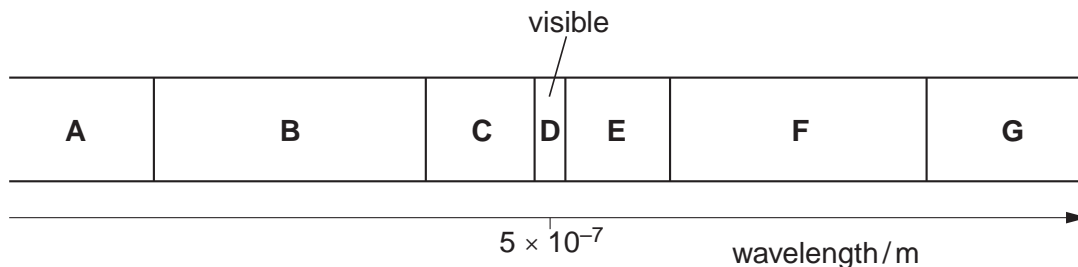


Fig. 5.1

Name the principal radiation in each of the regions A, C and F.

A C

F [3]

(c) An aerial mounted vertically transmits vertically polarised radio waves of frequency 1.0×10^9 Hz. The waves are detected by a receiving aerial some distance away. Initially the receiving aerial is also mounted vertically as shown in Fig. 5.2.

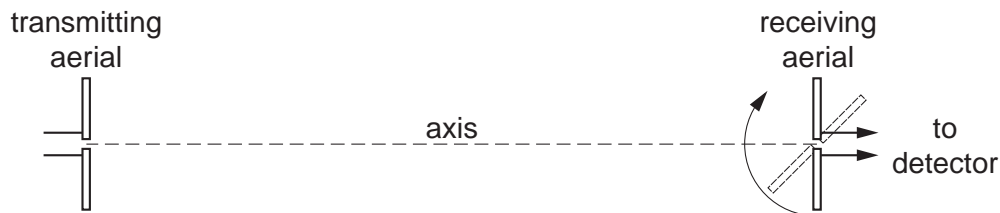


Fig. 5.2

The length of each aerial is half the wavelength of the radio waves.

(i) Calculate the wavelength of the waves.

wavelength = m [2]

(ii) Calculate the length of an aerial.

length = m [1]

(iii) The receiving aerial is rotated through 180° about the axis joining the centres of the two aerials. See Fig. 5.2. Describe and explain how the output signal from the receiving aerial changes with the angle of rotation.

.....
.....
.....
.....
.....
..... [3]

(d) Ultra-violet radiation from the Sun is often divided into three regions UV-A, UV-B and UV-C.

(i) Describe the characteristics and dangers of UV-A, UV-B and UV-C radiations.

.....
.....
.....
.....
..... [3]

(ii) Explain how sunscreen protects the human skin.

.....
..... [1]

(e) Explain why electrons can be emitted from a clean metal surface illuminated with bright ultra-violet light but never when infra-red light is used, however intense.

.....
.....
..... [2]

[Total: 16]