

- 4 (a) In order that interference between waves from two sources may be observed, the waves must be coherent.

Explain what is meant by

- (i) *interference*,

.....

[2]

- (ii) *coherence*.

.....

[1]

- (b) Red light of wavelength 644 nm is incident normally on a diffraction grating having 550 lines per millimetre, as illustrated in Fig. 4.1.

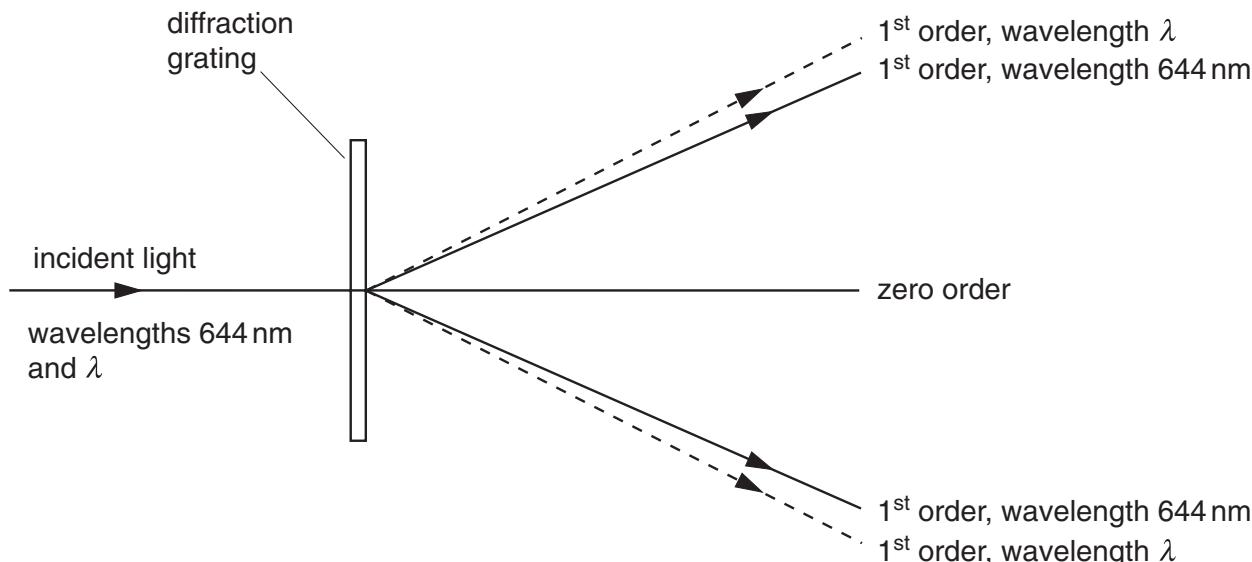


Fig. 4.1

Red light of wavelength λ is also incident normally on the grating. The first order diffracted light of both wavelengths is illustrated in Fig. 4.1.

- (i) Calculate the number of orders of diffracted light of wavelength 644 nm that are visible on each side of the zero order.

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number = [4]

- (ii) State and explain

1. whether λ is greater or smaller than 644 nm,

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

2. in which order of diffracted light there is the greatest separation of the two wavelengths.

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