4 **(a)** Explain the following terms with reference to the light diffracted by a diffraction grating that is used with a monochromatic light source.

(i) *diffraction*

.....

.....

.....[1]

(ii) *coherence*

.....

.....

.....[1]

(iii) *superposition*

.....

.....

.....[1]

(b) A parallel beam of white light that consists of wavelengths from 350 nm to 650 nm is incident normally on a diffraction grating that has 500 lines per millimetre.

(i) Calculate the maximum angle in the second order spectrum.

maximum angle = ...° [2]

(ii) Calculate the minimum angle in the third order spectrum.

minimum angle = ...° [1]

For Examiner's Use

(iii) Explain a problem with viewing the second or third order maxima of the white light with this diffraction grating.

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.....[1]