

- 5 (a) When white light is incident on a single slit, a diffraction pattern is formed on a screen.

The central fringe of the diffraction pattern is coloured at the edges and has a white central region. Explain this observation.

[2]

- (b) (i) Explain what is meant by the *Rayleigh criterion* for the resolution of the images of two objects.

[2]

- (ii) The Griffith Observatory in Los Angeles includes an astronomical refracting telescope (Griffith telescope) with an objective lens of diameter 0.305 m.

Calculate the wavelength of light for which the Griffith telescope has a minimum angular resolution of 1.8×10^{-6} rad.

wavelength = m [1]

- (iii) The asteroid Apophis has a diameter of 325 m. It has been calculated that in the year 2029, its distance of closest approach to the Earth's surface will be 3.0×10^4 km.

Supporting your answer with calculations, explain whether the Griffith telescope can resolve Apophis.

[2]

[Total: 7]