

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

The Griffith Observatory in Los Angeles includes an astronomical refracting telescope (Griffith telescope) with an objective lens of diameter 305 mm and focal length 5.03 m

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

wavelength = _____ m

(2)

- (b) The Griffith telescope is used to observe two point objects which subtend an angle of 1.8×10^{-6} rad at the unaided eye.

The typical human eye has a minimum angular resolution of approximately 3.2×10^{-4} rad

Calculate the focal length of the eyepiece lens so that an observer can just resolve the two objects when observing them through the Griffith telescope.

focal length = _____ m

(3)

- (c) The asteroid Apophis has a diameter of 325 m

It has been calculated that, in 2029, its distance of closest approach to the Earth's surface will be 3.0×10^4 km

The Griffith telescope may be used to view Apophis using the eyepiece calculated in question (b)

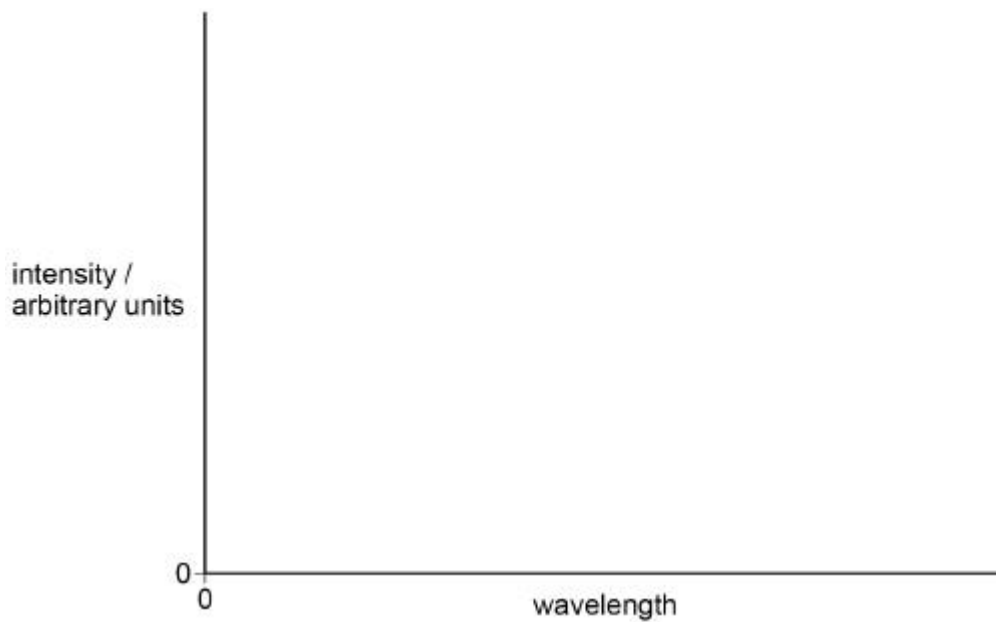
Deduce whether this telescope is suitable to obtain a detailed view of Apophis. Support your answer with a calculation.

(3)

(Total 8 marks)

Q2.

- (a) Sketch, on the axes, the black-body radiation curve for a typical star.



(2)

- (b) Explain, with reference to the SI units involved, how the curve you have drawn can be used to determine the black-body temperature of the star.

(3)

- The table shows some of the properties of the two stars.

Evaluate whether the data support the suggestion that the two stars form a binary system.

In your answer you should

- (6)**

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(1)
(Total 12 marks)